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THE EFFECTIVENESS OF THREE STUDY AIDS AS MEASURED BY IMMEDIATE EXAMINATIONS AND DELAYED EXAMINATIONS

by

Yousef Abdulwahab Abuhmaidan

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Philosophy
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
June 1989
Two experiments were performed to examine the effectiveness of three study aids: (1) information maps, (2) behavioral objectives, and (3) the students' own strategies in reorganizing written material. A training workshop was given prior to the first experiment to teach the students appropriate skills to use to read research articles (e.g., generating and answering questions, filling out and generating information maps). Eighteen undergraduate students participated in the study. In the first experiment, students were randomly assigned to three groups. The researcher provided students with a research article every week for three weeks, together with either an information map, a set of behavioral objectives, or instructions to write their own notes. One study aid was used each week by each group; every group used each of the three study aids once. A time to review their products was given to students followed by a multiple choice (immediate) exam. A non-announced delayed exam was given three weeks after each immediate exam. In the second experiment subjects were redistributed according to their performance on the first
three examinations. The same procedure was followed, but the researcher provided the students with the behavioral objectives and the students were asked to generate their own information map or students' own notes. The first three exams were given in one week over three consecutive days, and the three delayed exams were given two weeks later over three consecutive days. The results of the first experiment showed that both information maps and behavioral objectives were statistically significantly better than students' own notes. A practice effect was noticed in the improvement of the students' performance as a result of using the study aids. However, the results of the delayed exams indicated no significant difference. The results of the second experiment showed no significant difference between the three study aids in the immediate examinations or in the delayed examinations.
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The effectiveness of three study aids as measured by immediate examinations and delayed examinations

Abuhmaidan, Yousef Abdulwahab, Ph.D.
Western Michigan University, 1989
DEDICATION

I would like to dedicate this research to those from whom my enthusiasm was stemmed. To my faithful wife, Afnan, whose love, support, and daily encouragement made this work possible. To my lovely children, whose understanding for the situation I was in also provided me with much help. Finally, to those who have been waiting for this moment for a long time, my respected parents. To all of you, thanks.
ACKNOWLEDGEMENTS

I would like to take the opportunity to express my gratitude to Dr. Dale Brethower for his extensive guidance. His continuous support and feedback, throughout this research, helped me overcome all obstacles. I would like to thank Dr. Malott for his feedback and encouragement. I would like to thank Dr. Ulrich, Dr. Crowel, and Dr. Yancy for their support and feedback.

I also wish to express appreciation to those students who participated in this study. I would like to thank Angie Williams, Shayna Smith, Mike Bauer, and my colleagues who worked at the learning to learn center. I would like to thank my dear friends Mike and Clara Moore for their help and encouragement. Also, I would like to thank Helmi Yahya for his support and help.

Yousef Abdulwahab Abuhmaidan
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CHAPTER I

INTRODUCTION

Study Aids Evaluation

Written material and texts are likely to be an important resource in the classroom (Barnes & Clawson, 1975). The instructor often provides a preview or elaboration over the assigned text to help the students gain understanding as they take notes and read the textbook. The students usually use different methods in writing their notes. Researchers suggested several effective study aids to help the students in preparation and study for immediate or delayed examinations. Such study aids have been the subject of investigation and evaluation by many researchers.

Acquisition of Study Aids

Many researchers have suggested ways for teachers to increase students' acquisition of knowledge. Saint (1985) suggested three ways educators might increase the acquisition of knowledge: first, by improving the quality of teaching, second, by improving the quality of the instructional material, and finally by improving the
student's study skills. She added that the learner does not control the first two ways. Moreover, Drucker (1969) said that teachers can contribute more to the change process by teaching students how to use knowledge and its systematic acquisition as a foundation for performance, skill development, and achievement (Bryant & Anderson, 1972).

High school or college students try to learn from lectures by writing lecture notes and reviewing them later. Kiewra and Frank (1986) indicated that personal note-taking has limitations and may not be as effective as other study techniques.

One of the goals of education is to help students learn from reading. Students should learn a special technique for studying or taking notes. Therefore, much research has been conducted in what is known as the area of learning to learn, focusing on appropriate methods for helping students learn and recall what they read (Dinnel & Glover, 1985).

Effective strategies to be used in studying a text are being evaluated. Use of study aids is highly recommended by educational psychologists. Instructors are advised to provide students with study aids. The aids can help students learn how to organize the written material and, ultimately, help the students remember what they learn (Duell, 1974; Gagne & Britton, 1982; Hartley &
Davies, 1976; Kaplan, 1976). Skinner (1968) argues that the instructor should help the student learn how to make effective discriminations and how to cluster (gather similar information from written material) stimuli that have similar characteristics. An effective educational process might involve teaching students to rearrange stimuli in ways that facilitate learning.

The major purpose of this study is to evaluate the effectiveness of three study aids, (behavioral objectives, information maps, and the student's own strategy in organizing the material). All three aids require taking notes from a written text, in preparation for an immediate examination and for a delayed examination. Therefore, students were given a workshop that included teaching the appropriate reading techniques (reading textbooks and reading to answer objectives), and teaching the students how to construct and fill in an information map.

Organization as a Learning Strategy

Organization of material is an important technique in learning. Saint (1985) indicated that organization in learning has been studied at various levels of complexity such as organization of words in free recall, organization of passages, and organization of students' note taking (D'Agostino, 1969; Mandler, 1968; Moore,
The level of organization used in the present study was the organization of article material using three different study aids: (1) behavioral objectives, (2) information maps, and (3) students' own way of writing notes.

Organization of the material is beneficial in teaching. Hartely and Davis (1976) stated that organization is the hallmark of good teaching: arrangement of subject material will have an influence upon the student's learning. There are several preinstructional strategies that may facilitate learning of the written text. These strategies, such as behavioral objectives, and the overview or reorganization of the material in a form that makes study behavior easier, will facilitate learning and retention.

Behavioral Objectives

Definition

One of the solutions that has been proposed to help students learn how to study and master the material from textbooks is by using instructional objectives.

Duchastel (1979) indicated that early research in behavioral objectives showed that providing the students with behavioral objectives would facilitate learning. He examined the orienting role of objectives in the
organization of two texts consisting of short passages. One hundred thirteen French speaking female students participated in that study. The subjects were randomly assigned to three different conditions: (1) a group received six objectives (only three were related to the target topic), (2) another group received six objectives (none was related to the target topic), and (3) a group received no objectives and served as a control group. All groups received either one of two passages that shared only the target topic. Subjects were given time (10, or 15 minutes) to read the passages and were not allowed to write notes. All subjects were asked to do a test of free recall of the target topic, followed by a post test. The results indicated that the three conditions differed significantly. The group which received the relevant objectives recalled the target topic better than the control group, and the control group (without objectives; recalled the target topic better than the group with unrelated objectives.

Hartley and Davis (1976) suggested that behavioral objectives might be used as follows:

In situations in which students should be precisely informed of what it is they are to accomplish. They appear to be most suitable when they are used to preface quite long periods of instructions, which also might typically possess a dominant overall structure. (p. 258)

They added that behavioral objectives characteristically
employ "a list of structure, composed of numbered statements or questions arranged usually in a linear order. This order may reflect some kind of hierarchical or taxonomic sequence or arrangement." (p. 258)

Rationale

The rationale for using behavioral objectives in learning has been explained by many authors. Duchastel and Merrill (1973) stated that there are several rationales for using behavioral objectives in education. (a) Direction for teaching and curriculum development, (b) guidance in evaluation, and (c) facilitation of learning.

The use of behavioral objectives has a facilitative learning function in that the objectives orient students to the appropriate responses. In the present study, students were provided with behavioral objectives relevant to the instructional material to investigate the effectiveness of behavioral objectives in the recall of prose and to compare the findings of the present study with the previous research that used behavioral objectives such as: Duchastel, 1979; Frase, 1968; Gagne and Britton, 1982.
Supporting Research

Many researchers have studied the facilitative effects of using instructional objectives as a strategy to learn relevant text material (Kaplan, 1974; Kaplan & Rothkopf, 1974; Kaplan & Simmons, 1974). Frase (1968) stated that objectives may function as orienting stimuli and this may guide the students in reading and looking for the answer. Others indicated that the use of objectives may function as a summary or review but not orienting stimuli (Bruning, 1968). The present study used the instructional objectives to guide the students to the appropriate responses that might help them in recall for examinations.

Instructional objectives are important in the learning process, and learning with objectives is greater than without objectives (Kaplan, 1976). In an experiment, Kaplan studied the effects of instructional objectives for assigned readings investigating two densities of objectives. A group of 375 subjects participated in this study. The results showed greater intentional learning with objectives. Kaplan also found that there was a strong relationship between correct identification of objective relevant text sentences and subsequent test performance.
Another study that investigated the role of objectives in guiding the organization of information learned from text was conducted by Gagne and Britton (1982). They indicated that organization of the information from the text has facilitated long term utility of that information. Three hypothesis were tested: (1) objectives may influence the attention to the information in the text, (2) objectives may affect the sequence in which information is rehearsed during the review period, and (3) objectives serve as cues for recalling. Two hundred undergraduate students participated in this study. The subjects were divided into two groups: experimental and reference. The experimental group was divided into two groups. Both experimental groups read the behavioral objectives either before or after reading the passage but differed in the review condition: the first group was provided with a review period, but the second group was not provided with any review period. The reference groups were also divided into two groups: (1) half of the first group read the passage for 13 minutes with behavioral objectives and (2) the other half read the passage for 13 minutes but never had any behavioral objectives. The second group read the passage for 23 minutes instead of 13 but half of that group only was provided with behavioral objectives. Providing students with
objectives after reading and before reviewing helped students locate the correct responses. They also showed objective-relevant recall more than the groups that never had objectives even if they read for a longer period of time. These findings supported the hypothesis that organization by objectives occurs during rehearsal.

The position of behavioral objectives was investigated by many researchers. Royer (1977) investigated the effects of specificity and position of written instructional objectives on learning from lecture. One control group and four experimental groups participated in that study. The four groups received treatment that was different in either specificity of objectives (specific or general) or the position at which the behavioral objectives were presented (before or after) the assigned material. The results yielded a significant effect of the position of objectives for intentional learning (before text position).

In another study, Huck and Long (1973) investigated the effects of behavioral objectives on student achievement. In that study, nineteen senior and graduate students enrolled in a research course in educational psychology were randomly assigned to two groups separated before treatment. The first group received a list of instructional objectives, and the second group discussed an unrelated subject. The two groups were exposed to the
same lecture, and given a 12-item quiz covering the lecture. Behavioral objectives had an effect on student achievement.

Olsen (1973) assessed the effects of behavioral objectives on class achievement and retention. Six control classes and eight experimental classes participated in this study. The experimental classes received instructions with related behavioral objectives on the text. The experimental classes obtained higher mean scores on the achievement and the retention tests.

Regarding the effects of instructional objectives used as orienting stimuli or as summary/review upon prose learning, Kaplan and Simmon (1974) examined four experimental treatments: (1) objectives presented before text, (2) with relevant information (contained relevant text information) or without relevant information, (3) objectives presented after the text, and (4) with or without relevant information. Performance on relevant information was relatively high with no effect of the position of the objectives being presented before or after the text.

Chang (1976) provided one group of college students with instructional objectives and the other group was not provided with any. The results indicated that there were no significant differences in student achievements on immediate and delayed examinations.
Barker and Hapkiewicz (1977) examined the effectiveness of different levels of objectives. Sixty-four undergraduate students participated in the study. The subjects were randomly assigned to three groups and were given different levels of objectives: knowledge level, evaluation level, and no objectives. The results showed no differences between the three groups and that the objectives did not facilitate learning.

Summary

The relative effect of behavioral objectives on students' academic performance was discussed in most of the previous research. Different results were obtained—some were supportive while others indicated no significant effects. Moreover, the effect of the location of behavioral objectives, after or before reading the texts, was examined in most of the previous research and contradictory results were obtained. In general, most of the research indicated the importance of behavioral objectives as a study aid that helps students learn from the text. Therefore, the present study evaluated the effectiveness of behavioral objectives presented together with the reading material (no position of the behavioral objective was evaluated).

In the present study, behavioral objective study aids were compared with information maps, and with students' own notes.
Information Mapping

Operational Definition

Another strategy that facilitates learning is information mapping. It helps the student organize, summarize, and study the information in some courses that include lots of details such as: accounting, psychology, history, and economics (Heiman & Slomianko, 1988). Different names were given to this strategy: some called it information map (Heiman & Slomianko, 1988) others called it cognitive style map (Fourier, 1984), a hierarchical mapping technique, (Holley, Dansereau, McDonald, Garland, & Collins, 1979), and Hill model (Fourier, 1980). But all these names describe the study aid of information mapping.

Mustashio (1977) said that the information maps are helpful in the organization of information and are valuable in terms of their advantages to help students recall. Maps are also simple to construct and easy to read.

Theoretical Rationale

Information maps are helpful in the organization of information, as a communication device, and in teaching new stimuli (Danks & Gans, 1975; Shimmerlik & Nolan, 1976; Schwartz & Kulhavy, 1981). The cells in an
information map consist of different stimuli that evoke chains of responses. Each cell has the property of a discriminative stimulus in the prepense of which a certain response will be produced. The students may generate rules when constructing the information map. These rules may specify the relationship between different cells.

Much research has been conducted to investigate the effects of information maps on student achievement. Some of the results showed a significant effect (Fourier 1980; Holley, Dansereau, McDonald, Garland, & Collins, 1979; Schwartz and Kulhavy, 1981; Shimmerlik and Nolan, 1976). However, other researchers found no significant effects (Mustachio, 1977; Young, 1975).

Supporting Research

Schwartz and Kulhavy (1981) investigated the map features and the recall of discourse. In this study, 51 undergraduate volunteers were randomly assigned to three different conditions. Subjects were provided with a packet of material which contained instructions and a complete map device for the map group, an outline of the text with the features listed randomly for the list group, and only the outline with no features for the control group. All the groups studied the material while listening to the story about the text. Then they were
given a test packet that contained a sheet for free recall (instructions and blank paper) and the cued-recall test (32 completion items). The map group recalled significantly more unit ideas than the other conditions, feature items were better recalled, and the cued recall was superior to free recall.

Holley, Dansereau, McDonald, Garland, and Collins (1979) evaluated a hierarchical mapping technique (a networking process emphasizing the identification and representation of (type/part) hierarchies. Subjects converted prose into diagrams using a set of six links provided by the experimenters. Forty four college students were randomly assigned to two groups: experimental and control. The experimental group participated in six training sessions which consisted of: (1) a general introduction, (2) practicing a networking and organizing frame work with 500-1000 word passages, (3) practicing networking on their general psychology textbooks, (4) practicing on their own material aided by a lecture on the networking procedure, (5) practice making maps of the material, and studying a 3000 word passage and writing notes, and (6) reviewing the notes, taking multiple-choice test, and summarizing the passage in an essay. The control group participated two training sessions: (1) studying a 3000 word passage and write notes, and (2) reviewing the notes and taking a multiple-
choice test; they were instructed to use their own way in studying and note taking. All students were given short-answer, multiple-choice and essay tests. Net-working helped the students in acquiring and organizing the main ideas but did not help in the acquisition of the details. There was a difference between the performance of the groups on the essay test (which assessed the retention of main ideas), but no differences were obtained on the multiple choice or short-passage material.

Fourier (1984) investigated the effectiveness of disclosure of cognitive style map information on academic achievement in adult learners. Sixty-one community college students enrolled in a human anatomy course participated in this study. The students were randomly assigned to either one of two groups: the control group subjects received a placebo disclosure treatment while the experimental group subjects received the Albany Instrument (a 125 item, forced choice questionnaire to be used to complete an answer sheet) in order to generate a cognitive style map. (A cognitive style map provides a description of how an individual prefers to learn). Subjects in the experimental group were provided with an interpretation of the meaning of their cognitive style maps. There was a nonsignificant difference between the two groups in academic achievement.

Shimmerlik and Nolan (1976) evaluated two ways of
reorganizing material while taking notes: (1) in an information map reorganizing the material according into special categories, and (2) in a sequential order as the passage was presented. Subjects who took notes by reorganizing the material (information map) obtained significantly higher scores than subject who took the notes in the sequential order that appeared in the passage.

Information maps can be helpful in teaching students novel stimuli. Danks and Gans (1975) conducted a study on eighty undergraduate students, randomly assigned to four experimental conditions, to investigate the effect of a rule matrix used for the construction of stimulus-response pairs on the acquisition of new stimulus-response pairs. The stimuli were colored shapes and the responses were the corresponding two-digit numbers. The matrix was shown and explained to the students before, during, after the learning trials, or not at all. The results showed that the presentation of the matrix before or during learning trials facilitated learning the novel stimuli.

The use of information maps might be increased by providing the students with some type of incentives. Almasri (1987) investigated the effects of academic point incentives on the use of information maps. Thirty undergraduate high risk students participated in this
study. The results showed that when an incentive-point condition was in effect, the students used the forms (information maps), provided by the researcher, to write notes while reading from text; but when the incentive-point condition was withdrawn, most of the students used their own way of taking notes. When the point condition was in effect again, the students went back to using the information maps in writing their notes.

Summary

The effect of information mapping on students' academic performance was discussed in the previous research. The results were sometimes supportive and sometimes nonsignificant. An important effect of information maps is that they can influence the total acquisition of novel stimuli. Moreover, information maps helped students in acquiring and organizing main ideas. The research indicated the importance of information maps as a study aid that may help students learn from the maps. Therefore, the present study evaluated the effectiveness of information maps generated by the researcher and/or the students compared with other study aids such as behavioral objectives and the students' own ways of organizing the material. The present study also investigated the effectiveness of information maps in the acquisition of details as well as general information.
The Students' Own Notes in Reorganizing Prose

Theoretical Analysis and Definition

Note taking while reading written material is another strategy that students often use. Ideally, note taking may serve one or both of two functions:

1. converting the reading material into meaningful stimuli by changing, grouping, rearranging, and/or adding similar stimuli.

2. providing the reader with written, organized summaries to be reviewed later. The effectiveness of the summaries are evaluated by the students' performance in the examinations (Annis & Davis, 1975). The process of converting reading materials may help students generate appropriate comparisons and/or contrasts among parts of the written material. These kinds of behaviors (identifying or clarifying stimuli) are normally reinforced by the consequences of those behaviors (Heiman & Slomianko, 1984; Skinner, 1968).

Pepper and Mayer (1986) stated that note-takers performed better on long delayed tests and non note-takers performed better on immediate tests.

Supporting Research

Many researchers have stated that the reorganization
of the material by rewriting of the written material while reading (note-taking), may facilitate recall (Moore, Hauck, & Furman, 1975). They investigated the short-and long-term retention effects of training 120 public-school students to organize and classify information. Five treatment groups: self-imposed organization, super-imposed organization, serial memorization, controlled super-imposed organization, and controlled self-imposed organization were given a list of 25 words to learn. All groups received the needed training. Retention was tested by asking the students to organize the words they could recall. The groups that used self-imposed, super-imposed, and serial memorization performed significantly better than both the self-imposed control group and the super-imposed control group.

Other researchers (Fisher & Harris, 1974) interpreted the reorganization of the written material as a matter of encoding (converting the written material into meaningful stimuli) that may help students in later recall of the summarized notes. Annis and Davis (1975) investigated the importance of the note-taking function by means of an encoding or an external memory device, or both of them combined. Eighty-five students attended a 40-minute lecture on the principles of behavior modification. The students were randomly divided into a control group in which the students did not receive any
instructions about note taking, and did not get to review
t heir notes before the examination on the lecture
material, a note-taking condition in which the students
were instructed to take notes, and a note-taking
condition in which the students were given a copy of the
lecturer's notes. The two note-taking conditions groups
reviewed their own notes, or a copy of the lecturer's
note, or both, or reviewed from memory. A significant
treatment effect was obtained for the total score and for
the number correct on the short answer items, but not for
the number correct on the objective items.

Summary

The effectiveness of the students' own way of
organizing the written material on their academic perfor­
mance was investigated in the previous research. Some
researchers modified the students' study behavior by
teaching them new study techniques. Others considered
the students' own way of organizing the written material
an effective and helpful study aid. In the present study,
the effectiveness of the students' own way of taking
notes was evaluated and compared with information maps
and behavioral objectives.

Related Study Aids Evaluation Research

Other researchers evaluated the effectiveness of
different study aids in the retention of reading material. Saint (1985) studied the effectiveness of three study aids: (1) matrix organizational format, (2) self-structured study notes, and (3) outline organizational format on a comprehension examination. Ninety-two public high school students were randomly assigned to the three experimental conditions. The three passage orders: (1) negative reinforcement, overlearning, shaping and prompting; (2) shaping, prompting, negative reinforcement, and overlearning and; (3) prompting, overlearning, shaping and negative reinforcement) were randomly selected and provided to the students along with a five column matrix (information map) study aid for Group 1, a four section outline study aid for Group 2, and a handwritten copy of notes for Group 3. Subjects were given 20 minutes to read the passages and use the study aids, then they were given a thirty minute test. The results of the post test showed no significant difference among the three study aids.

The Purpose of the Present Study

Most of the previous literature discussed study aids in terms of the location (before, during, or after reading), intentional or incidental learning effect, the density of the information, review or no review periods, and the study aids effects on the students' performance.
In most of that research, they compared the performance of an experimental group with a control group. Only few of the previous researchers compared the effectiveness of more than one study aid in the same study. However, the present study evaluates and compare the effectiveness of three different study aids: (1) behavioral objectives, (2) information maps, and (3) students' own way of writing notes. Moreover, the students in this study were provided with a training workshop on the use of the three different study aids for reading research articles. Then they practiced the use of study aids by doing some exercises from an assigned textbook.
CHAPTER II

METHOD

Subjects

The subjects participating in the first experiment of this study were seventeen students, 11 males and 6 females, with ages ranging from 17 to 21. All students were enrolled in the 3:00-5:00 pm section of Psychology 397, a self-management and learning-to-learn course for the winter (1989) semester at Western Michigan University (WMU), Kalamazoo, Michigan.

Students electing Psychology 397 were from four different groups of undergraduate students:

1. Martin Luther King (MLK) program. The students enrolled in the MLK program must have a minimum ACT composite score of ten and at least a 1.80 high school grade point average (GPA) in the core courses of English, Math, and Science. Those students were advised to take that course by the director of MLK program.

2. Alpha students who must have a minimum ACT score of eighteen, the national average, and a high school GPA of 2.0 or higher. Alpha students have the option of taking either Psychology 397 or an English class. Both MLK and Alpha students did not meet the normal entry
requirements for the university so they were entered under those special programs. Both MLK and Alpha students are on academic probation for one year and should achieve a GPA of 2.0 or higher by the end of that academic year.

3. Readmitted students under the Arts and Sciences program and the University Curriculum program. These students were previously dismissed from the university because they had an overall GPA lower than 2.0 for two consecutive semesters.

4. Students who are self-referred (4 students). These students might have heard about the course from friends or counselors but are not identified with a special high risk population.

Setting

This study was conducted in the Department of Psychology at Western Michigan University, Kalamazoo, Michigan, in the Center for Self Management where the students attend Psychology 397.

Psychology 397 is a course that provides the students with knowledge and skill to enable them to learn and master the basic principles of organizing, acquiring, and demonstrating mastery of the material in college courses. The contents of the course are basic principles of learning, learning skills, and research on learning.
Psychology 397 class was originally developed for students who want to improve their academic performance, but lack of time-management skills, self-management and appropriate skills have not allowed them to do so.

In the first class meeting, the instructor told the students about the nature of the class and gave them the syllabus for the course. The instructor informed them about the importance of the course and the type of research that was being conducted in this class in order to provide the maximum benefits of the learning-to-learn system. Heiman and Slomianko, 1988 defined the learning to learn system as: "provides students with a set of analytical thinking skills which result in significant, long-term improvements in college-point averages and retention through graduation." The instructor gave an overview of the learning skills and how to use them. Moreover, he explained the best ways to read assigned material, especially research articles, and how to prepare for the examination. At the end of the first two hour class, the instructor asked the students to read Chapter III, pp. 29-50 and Chapter VI, pp. 126-140 from the assigned textbook Methods of Inquiry & Technology of Change (Heiman and Slomianko, 1988). The students were asked to read the chapters and to do the exercises of each chapter. Each exercise was worth 5 points out of 180 points assigned for skill mastery in this class. The total points for the class was 2000.
Training Workshop

In the second class meeting, a graduate assistant, who is an expert in learning to learn skills, ran the workshop. First, the assistant explained the two chapters. The first chapter was about reading techniques, and covered the following topics: (a) asking subject-relevant questions, (b) asking what if . . . questions, (c) reading to answer questions (reading textbook), and (d) reading without headings. The second chapter was about information mapping and covered the following topics: (a) why and how to construct information maps, (b) advantages of making a map (c) how much information in a course can be summarized in information maps, (d) what's most important about an information map, and (e) examples and exercises. Then the assistant did some examples on the blackboard and inspected students' homework. After that, the assistant raised some questions and told the students to answer them. Finally, he asked the students if they had any questions. Some were asked and the assistant provided the needed answers. The workshop lasted for one hour. Then the first experiment started.
Experiment #1

The purpose of the first experiment was to examine the effectiveness of three study aids: (1) behavioral objectives, (2) information maps, and (3) the students' own notes. The first two aids, behavioral objectives and information maps, were designed and prepared by the researcher, under the supervision of the instructor. The students were randomly assigned into three groups. They were given three different articles (one article each week) to read and write notes using the aids as assigned for that group to use. In the first experiment, we compared student performance on immediate and delayed examinations. The following matrix, Table 1, shows that the three groups were given a new article to read each week. For article A, Group 1 was given an information map to fill out for further use. Group 2 was given behavioral objectives and asked to answer them. Group 3 was asked to read the material and to write their notes by organizing the material in the way they thought would help them study later for the examination. In the following two weeks, the groups were given new articles and each group was given the other study aids.
Table 1
The Distribution of the Groups Across Articles
Across Study Aids

<table>
<thead>
<tr>
<th>Article</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own Notes</th>
<th>Class Meets On</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Group 1</td>
<td>Group 2</td>
<td>Group 3</td>
<td>Second Week</td>
</tr>
<tr>
<td>B</td>
<td>Group 2</td>
<td>Group 3</td>
<td>Group 1</td>
<td>Third Week</td>
</tr>
<tr>
<td>C</td>
<td>Group 3</td>
<td>Group 1</td>
<td>Group 2</td>
<td>Fourth Week</td>
</tr>
</tbody>
</table>

Experimental Design

The researcher used a combination of within subject and between group design. The within subject design consists of three treatments: information mapping, behavioral objectives, and students' own notes. Finally, three examinations were given later to measure students' performance on the material they had studied before. In this study the researcher compared between each group's performance in the three different treatments and between the performance of the three groups.

Finally, and for the purpose of this study, we evaluated the effectiveness of the three study aids in the students' performance on the examinations over the studied material. In the first phase, we measured the students' performance on the immediate examination. In
the second phase, we measured the recalling of the material after three weeks from each examination. Therefore, we tested, in the same manner, each group's performance on each treatment, and compared the performance of each group with the other groups in each different treatment.

Materials

The instructor provided the students with three different articles: (1) Duell, O. K. (1974), "Effect of objective, level of test questions, and the judged importance of tested materials upon post test performance"; (2) Shimmerlik, S. M. and Nolan, J. D. (1976), "Reorganization and recall of prose"; and (3) Pepper, R. J. and Mayer, R. E. (1985), "Generative effects of note-taking during science lectures." The average length of these articles was 7 pages. Each article described two experiments in the learning-to-learn field. The articles were chosen for two reasons:

1. To help students to know more about the research conducted in this area.

2. To provide information that required the students to use the skills we intended to evaluate. Both reasons ultimately served and helped in designing a better learning-to-learn class.
Study Aids

Information Maps

The researcher provided one group with prepared information maps for each article. The students' task was to study the article and fill out the information maps, according to the instructions provided in the workshop. The three information maps provided to the students are in Appendix A. The information map had different cells. In these cells, there were some important questions about the attached article, with enough space for answering these questions.

Behavioral Objectives

The researcher provided one group with behavioral objectives for each article. The objectives covered all the reading material (see Appendix B).

Students' Own Notes

The researcher provided one group with the blank sheets of paper and written instruction that told students to take their notes in organizing the material, for later use (see Appendix C).
Instruction Sets

Two sets of instructions were provided together with the articles and the study aids: (1) about reading the article and doing whatever that person was asked to do, (2) about the testing procedure (see Appendix D).

Immediate Examinations

The students' performance in the immediate examinations 1, 2, 3, (see Appendix E) over the reading articles is the first dependent measure. Each examination consisted of twenty five multiple choice questions and true/false questions. These questions covered the material and each examination was given to the students immediately after finishing reading the notes. These examinations and the answer keys are available in the appendices.

Delayed examinations

The second dependent measure was the students' performance on the three delayed examinations 1, 2, 3 (see Appendix F). These examinations were essentially the same examinations which were given earlier with a slight changes in the order of the questions or the options. Five questions from different difficulty levels were eliminated according to the analyses of the correct responses of each question in each examination.
Every examination was graded separately by the researcher and checked by an independent observer. Finally, a 25% inspection was conducted by the instructor of the class. One hundred percent accuracy of the grading and the recording of the grades was obtained.

Procedure

Subjects were divided into three groups as described earlier. In order to avoid the difficulty of the written material as a confounding variable, three articles were given to the students.

The training session was started in the first meeting with the students, and it was completed in the second meeting. In the first phase, the students met once a week with the researcher for three weeks. Each meeting lasted for about two hours. The researcher randomly assigned the treatments to the groups and provided them with two sets of instructions (see Appendix G) together with the articles and the assigned treatment. Prior to the beginning of the experiment, a brief description about the experiment and the given materials was provided. The students were told that they would be given a delayed examination at a later date. Therefore, the students were encouraged to study carefully and master the material. The exact date of the delayed examination was not revealed to the students. Therefore,
they were only informed that they would be given a delayed examination on the material later on. The students then were asked to read the instructions carefully before they start reading the article. The instructions specified the agenda for the activity required for that day. The students were asked to read the material and answer the behavioral objectives accordingly (see Appendix B), or fill out the information map (see Appendix A), and or do their own notes (see Appendix C), within 45 minutes. They handed in the articles and their products of notes and a ten minute break was given to the students. Upon returning to class after the recess, the researcher gave the students back their products (the written notes) and asked them to study these products for 15 minutes. Then they handed in the products and were asked to answer the examination (see Appendix E) for 30 minutes.

**Delayed Examination**

The researcher asked the students to sit in their previously assigned seats to take the delayed examinations. A set of instructions (See Appendix H) was handed to the students prior to the examination. The delayed examinations (see Appendix I) were given three weeks after each immediate examination. For example, the immediate examinations were given in the second, third,
and the fourth week of the semester, and the delayed examinations were given in weeks five, six, and seven.
CHAPTER III

EXPERIMENT #1: RESULTS AND DISCUSSION

Results

One purpose of this study was to determine if there was any difference in immediate examination scores and delayed examination scores as an effect of using three different study aids. As mentioned earlier, three different study aids were used in every meeting and with a different group every time. Two of the study aids in Experiment 1 were prepared by the researcher (behavioral objectives and information maps) and third one was prepared by the students (their own notes).

Immediate Examinations

Study Aids Evaluation

A Latin square design analysis was performed on the dependent variables of the examination scores (immediate examinations and delayed examinations). A summary of the results is shown in Table 2.

The statistical analysis revealed that a significant study aid effect $F(8.97) = 0.0011 \ P < .05$ was obtained. The article + study aid interaction was not significant $F(1.18) = 0.3224$. To find if the study aids were
Table 2
Anova Table for Latin Square Design

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>F value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>14</td>
<td>579.90</td>
<td>3.85</td>
<td>0.0014</td>
</tr>
<tr>
<td>Article</td>
<td>2</td>
<td>327.58</td>
<td>15.24</td>
<td>0.0001</td>
</tr>
<tr>
<td>Study Aid</td>
<td>2</td>
<td>192.81</td>
<td>8.97</td>
<td>0.0011 *</td>
</tr>
<tr>
<td>Article* Study Aid 2</td>
<td></td>
<td>25.42</td>
<td>1.18</td>
<td>0.3224</td>
</tr>
</tbody>
</table>

statistically significant, Bonferroni (Dunn) t-tests were used. The results of the t-test indicated that both the information map and behavioral objectives were significantly better study aids than the students' own notes. However, there was no statistically significant difference between the information map study aid and the behavioral objectives. Moreover, there were a significant subject effect and a significant article effect. The Bonferroni t-test indicated that the performance of the students was affected more in the first examination where the first article was given.

Groups and Study Aids

A mean score analysis was done to find out which study aid was superior. (see Table 3)
Table 3
Experiment #1: Immediate Examinations
Group and Study Aid Analysis

<table>
<thead>
<tr>
<th>Group</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78%</td>
<td>89%</td>
<td>79%</td>
<td>82%</td>
</tr>
<tr>
<td>2</td>
<td>79%</td>
<td>71%</td>
<td>74%</td>
<td>75%</td>
</tr>
<tr>
<td>3</td>
<td>83%</td>
<td>72%</td>
<td>58%</td>
<td>71%</td>
</tr>
<tr>
<td>Mean</td>
<td>80%</td>
<td>77%</td>
<td>70%</td>
<td>76%</td>
</tr>
</tbody>
</table>

In Table 3, Group 1 had the highest mean score (82%) when they used behavioral objectives. The difference between the other two study aids was not high even though the students' own notes aid (82%) was slightly higher than Information notes (78%). Group 2 had the highest mean score (75%) when they used information maps. Students' own notes had the second highest mean score of (74%) compared to behavioral objectives which scored 71%. Group 3 had also the highest mean when they used the information maps (83%), the second highest mean score of (72%) when they used behavioral objectives, and had the lowest score (58%) when they used their own notes.

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Group Performance on Examinations

The statistical analysis revealed a significant subject effect $F(3.85) = 0.0014$ $p < .05$. The performance of the groups is summarized in Table 4 where the mean of each group on each examination was scored.

Table 4

<table>
<thead>
<tr>
<th>Group #</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Exam 3</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78%</td>
<td>79%</td>
<td>89%</td>
<td>82%</td>
</tr>
<tr>
<td>2</td>
<td>71%</td>
<td>79%</td>
<td>74%</td>
<td>75%</td>
</tr>
<tr>
<td>3</td>
<td>58%</td>
<td>72%</td>
<td>83%</td>
<td>71%</td>
</tr>
<tr>
<td>Mean</td>
<td>69%</td>
<td>77%</td>
<td>82%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Group 1 had the highest mean (82%) on the three examinations. Each examination represents a different study aid administered in a different week. Group 2 ranked the second where the performance mean score was 75% and the third group mean was 71%, the lowest among the three groups. Group 1 had the highest mean score on each examination, 78%, 79%, 89%,. Group 2 yielded the second highest mean score in each examinations, 71%, 79%, 74%. The third group had the lowest mean score in the three examinations 58%, 72%, 83%. The progress of
students' performance was noticed, the means were 69% in the first examination, 77% in the second examination, and 82% in the third examination.

Examinations and Study Aids

An analysis of the effect of study aids on students' performance on examinations is shown in Table 5.

Table 5

Experiment #1: Immediate Examinations and Study Aids

<table>
<thead>
<tr>
<th>Exam</th>
<th>Information map</th>
<th>Behavioral objectives</th>
<th>Students' own notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78%</td>
<td>71%</td>
<td>58%</td>
<td>69%</td>
</tr>
<tr>
<td>2</td>
<td>79%</td>
<td>72%</td>
<td>79%</td>
<td>77%</td>
</tr>
<tr>
<td>3</td>
<td>83%</td>
<td>89%</td>
<td>74%</td>
<td>82%</td>
</tr>
<tr>
<td>Mean</td>
<td>80%</td>
<td>77%</td>
<td>70%</td>
<td>76%</td>
</tr>
</tbody>
</table>

On examination 1 the highest mean score was 78% when information map was used, the behavioral objectives came in the second order (71%) and the students' own notes had the lowest mean score (58%). In the second examination, both study aids, information maps and own notes, were equal (79%) compared to behavioral objectives which had the lowest mean (72%). In the third examination, behavioral objectives had the highest mean (89%) compared
to 83% for the information map and 74% for students' own notes.

Delayed Examinations

Study Aids Evaluation

A Latin square design analysis was also performed on the dependent variables of the examination scores (delayed examinations). A summary of the results is shown in Table 6.

Table 6

Anova Table for Latin Square Design

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>F value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>13</td>
<td>194.85</td>
<td>2.39</td>
<td>0.0327</td>
</tr>
<tr>
<td>Article</td>
<td>2</td>
<td>95.53</td>
<td>7.62</td>
<td>0.0029</td>
</tr>
<tr>
<td>Study Aid</td>
<td>2</td>
<td>1.41</td>
<td>0.11</td>
<td>0.8939</td>
</tr>
<tr>
<td>Article* Study Aid</td>
<td>2</td>
<td>3.16</td>
<td>0.25</td>
<td>0.7793</td>
</tr>
</tbody>
</table>

The statistical analysis revealed a non significant study aid effect $F(0.11) = 0.8939 \; P < .05$. The article + study aids interaction was not significant $F(0.25) = 0.7793$. In addition, significant subjects and article effects can be seen from Table 6.
Group Performance on Examinations

The statistical analysis revealed a significant subject effect $F (2.39) = 0.0327 \ p < .05$. The performance of the groups is summarized in Table 7 where the mean of each group on each examination was scored.

Table 7

Experiment #1: Delayed Examinations
Group Performance on Examination Analysis

<table>
<thead>
<tr>
<th>Group #</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Exam 3</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58%</td>
<td>76%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>2</td>
<td>50%</td>
<td>63%</td>
<td>53%</td>
<td>55%</td>
</tr>
<tr>
<td>3</td>
<td>39%</td>
<td>61%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Mean</td>
<td>49%</td>
<td>67%</td>
<td>57%</td>
<td>57%</td>
</tr>
</tbody>
</table>

As in the immediate examinations, Group 1 got the highest mean score on the three examinations (67%), then Group 2 (55%), and Group 3 had the lowest score (50%).

Groups and Study Aids

The statistical analysis revealed a non significant study aid effect $F (0.11) = 0.8939 \ p < .05$. The performance of the groups is summarized in Table 8 where the mean scores of study aids were computed.
Table 8
Experiment #1: Delayed Examinations
Group and Study Aid Analysis

<table>
<thead>
<tr>
<th>Group #</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own Notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58%</td>
<td>67%</td>
<td>76%</td>
<td>67%</td>
</tr>
<tr>
<td>2</td>
<td>63%</td>
<td>50%</td>
<td>53%</td>
<td>55%</td>
</tr>
<tr>
<td>3</td>
<td>50%</td>
<td>61%</td>
<td>39%</td>
<td>50%</td>
</tr>
<tr>
<td>Mean</td>
<td>57%</td>
<td>59%</td>
<td>56%</td>
<td>57%</td>
</tr>
</tbody>
</table>

The difference between the three study aids was very small (57%, 59%, 56%).

Examinations and Study Aids

Table 9 summarizes the effect of study aids on the groups' performance on the examinations. The difference between the three delayed examinations (49%, 67%, 57%) was not statistically significant.
### Table 9

**Experiment #1: Delayed Examinations and Study Aid Analysis**

<table>
<thead>
<tr>
<th>Exam</th>
<th>Information Maps</th>
<th>Behavioral Objectives</th>
<th>Students' Own notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58%</td>
<td>50%</td>
<td>39%</td>
<td>49%</td>
</tr>
<tr>
<td>2</td>
<td>63%</td>
<td>61%</td>
<td>76%</td>
<td>67%</td>
</tr>
<tr>
<td>3</td>
<td>50%</td>
<td>67%</td>
<td>53%</td>
<td>57%</td>
</tr>
<tr>
<td>Mean</td>
<td>57%</td>
<td>59%</td>
<td>56%</td>
<td>57%</td>
</tr>
</tbody>
</table>

**Delayed and Immediate Examination Correct Responses Comparison**

Further analysis was done to describe the relation between the performance on the immediate examinations and the delayed examinations. The main interest in the delayed examinations also to measure the recall of items learned (answered correctly on the immediate examinations). Therefore, we computed the percentage of items learned that were remembered. The formula was: Correct responses on delayed examinations (which were also correct in the immediate examinations) divided by the total correct responses in the immediate examinations (see Table 10).
Table 10

Experiment #1: Delayed and Immediate Examination
Correct Responses Comparison

<table>
<thead>
<tr>
<th>Group #</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own Notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64%</td>
<td>69%</td>
<td>78%</td>
<td>70%</td>
</tr>
<tr>
<td>2</td>
<td>67%</td>
<td>55%</td>
<td>72%</td>
<td>65%</td>
</tr>
<tr>
<td>3</td>
<td>55%</td>
<td>62%</td>
<td>43%</td>
<td>53%</td>
</tr>
<tr>
<td>Mean</td>
<td>62%</td>
<td>62%</td>
<td>64%</td>
<td>63%</td>
</tr>
</tbody>
</table>

The analysis shows that Group 1 not only learned the most, but also remembered the most of what they learned (Table 10). Group 3, similarly, learned the least and remembered the least of what they learned. In general, the analysis of the Table 10 shows that the difference among the three study aid means was very small although 2 groups retained most when they had studied using their own notes.

The Analysis of Students' Products

For further analysis to discover why behavioral objectives and information maps were superior in the immediate examinations to the students' own notes, the students' products (notes entered on information maps, answers to the objectives, or student's own notes) were
examined. The two measures that the researcher was looking for were: (1) the key words, and (2) the total number of words used in the notes. The key words, defined as the words that might be the appropriate responses for the examination questions or the main headings in the article that might help students to perform well on the examinations. A simple correlation analysis was performed. Information maps yielded a higher percentage of key words than students' own notes or behavioral objectives. Own notes yielded a larger number of words than information maps or behavioral objectives. There was a significant correlation between key words and delayed examination 1 score \( r = .54 \). However, no significant correlation was noticed between the key words and the immediate examination 1 score \( r = .25 \). Moreover, the results revealed no correlation between the key words and the second \( r = .01 \) or third \( r = .07 \) immediate and delayed second \( r = .03 \) or third \( r = .06 \) examinations. There was no correlation between total number of words and immediate examinations \( r = -0.33 \). The correlate scores within a study aid vs key words was calculated using the covariance analysis. The results indicated that key words under the information mapping study aid may be correlated with the delayed examinations scores. The key words appeared to be correlated to delayed examination scores for behavioral objectives, but the
relationship differs according to which examination (negatively correlated with examination 3 and positively with examination 1 and 2). The students' own notes yielded more words than information mapping. Groups did not differ significantly at alpha = .05 for article 2 and 3.

Key Words and Total Words Mean Score Analysis

The following mean-score analysis showed the relation between the key words and number of words written in the notes and scores on the immediate examinations and delayed examinations.

For a larger picture of analysis we compared the performance of the three groups in terms of the number of generated key words and the total number of words (see Table 11).

Table 11

Experiment #1: Key Words (KW) and Students' Performance on the Immediate (I.), Delayed (D.), Examinations (EX)

<table>
<thead>
<tr>
<th>Group</th>
<th>KW</th>
<th>I.EX</th>
<th>D.EX</th>
<th>KW</th>
<th>I.EX</th>
<th>D.EX</th>
<th>KW</th>
<th>I.EX</th>
<th>D.EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>69%</td>
<td>78%</td>
<td>58%</td>
<td>64%</td>
<td>89%</td>
<td>67%</td>
<td>53%</td>
<td>79%</td>
<td>76%</td>
</tr>
<tr>
<td>2</td>
<td>73%</td>
<td>79%</td>
<td>63%</td>
<td>64%</td>
<td>71%</td>
<td>50%</td>
<td>68%</td>
<td>74%</td>
<td>53%</td>
</tr>
<tr>
<td>3</td>
<td>86%</td>
<td>83%</td>
<td>50%</td>
<td>63%</td>
<td>72%</td>
<td>61%</td>
<td>53%</td>
<td>58%</td>
<td>39%</td>
</tr>
<tr>
<td>MEAN</td>
<td>76%</td>
<td>80%</td>
<td>57%</td>
<td>64%</td>
<td>77%</td>
<td>59%</td>
<td>58%</td>
<td>70%</td>
<td>56%</td>
</tr>
</tbody>
</table>
The three groups generated more key words when using the information maps (76%) and had the highest mean score in the immediate examinations (80%). The three groups generated 64% of key words under behavioral objectives and obtained the second highest mean score in the immediate examinations (77%). The three groups generated the lowest number of key words under students' own notes (58%) and obtained the lowest mean score in the immediate and delayed examinations.

The analysis of the total number of words written in the students notes was described in Table 12. It is obvious that three groups wrote the lowest mean number of words under the information maps (275) and the highest mean number of words under own notes (362).

Table 12

Experiment #1: Total Words and Students' Performance on the Immediate and Delayed Examinations

<table>
<thead>
<tr>
<th></th>
<th>Information map</th>
<th>Behavioral objectives</th>
<th>Students' Own Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>#W I.Ex D.Ex</td>
<td>#W I.Ex D.Ex</td>
<td>#W I.Ex D.Ex</td>
</tr>
<tr>
<td>1</td>
<td>241 78% 58%</td>
<td>255 89% 67%</td>
<td>372 79% 76%</td>
</tr>
<tr>
<td>2</td>
<td>214 79% 63%</td>
<td>293 71% 50%</td>
<td>355 74% 53%</td>
</tr>
<tr>
<td>3</td>
<td>370 83% 50%</td>
<td>314 72% 61%</td>
<td>360 58% 39%</td>
</tr>
<tr>
<td>MEAN</td>
<td>275 80% 57%</td>
<td>287 77% 59%</td>
<td>362 70% 56%</td>
</tr>
</tbody>
</table>
Discussion

The main purpose of this study was to investigate the effectiveness of study aids in answering questions on immediate examinations and delayed examinations. The results of the first experiment indicate that there was a statistically significant effect of study aids in the immediate examinations, but there was no significant differences in the delayed examination.

Immediate Examinations

Behavioral objectives and information maps were statistically better than the students' own notes. However, there was no significant difference between the behavioral objectives and information maps.

Information maps and behavioral objectives were prepared by the researcher and the student's own notes, was made by students. It could be that both aids (information maps and behavioral objectives) were prepared in a way that had the appropriate stimuli which might have helped the students to evoke the appropriate responses. Instructors in the education field tend to provide their students with study aids in order to have them respond to the most important part of the text. Usually, the questions on the examinations, are related to those items indicated in the study aids. Behaviorally
speaking, the items on the objectives and maps are stimuli that set the occasion for the readers to respond appropriately (answer the objectives or fill the information map). Students learn by the effect of stimulus generalization to respond similarly once these similar stimuli (questions containing similar words as in the behavioral objectives and information maps) are presented in the examination. The students are supposed to answer the objectives or fill out the information map correctly, so this might enable them to answer correctly on the examination.

The mean-score analysis indicated that Group 1 (which started with information maps) had the highest mean score (82%) on the three examinations. Their scores got higher with each examination. This might be a result of acquiring the skills of finding the important stimuli that were present on the information maps, and later on, they used this skill in the other procedures. Therefore, this affected their performance in the examination.

The study aids (information maps and behavioral objectives) were statistically superior to (with no superiority of either one) the students' own notes study aid. Group 2, which started with behavioral objectives, obtained a mean score of 74% in the first examination. Their performance was improved once they used information maps, (79%), but their mean score was less (74%) when
they used own notes. Group 3 which obtained the lowest mean score (70%) started with students' own notes (58%) and their grade improved when they used behavioral objectives (72%) and, they got their highest mean score when they used information maps (83%). The mean-score analysis indicated that the highest mean score was for information map (80%), then behavioral objectives (77%), and finally own notes (70%).

Delayed Examinations

There were no significant differences as a function of the study aids in the delayed examinations. However, the mean score analysis indicated that the first group still had the highest score in the three delayed examinations (67%) while Group 2 had (55%) and Group 3 (57%).

Moreover, the comparison between the same correct responses in both examinations compared to the total correct responses in the immediate examinations indicated that Group 1 not only learned the most but also remembered the most of what they learned. Group 3 learned the least and remembered the least of what they learned whereas Group 2 was between Group 1 and 3 on both analyses.

Finally, a correlation test was conducted to determine if the number of key words or total number of words that students wrote in their notes correlated with
their performance on the examinations. The results revealed no correlation except between the key words and the first delayed examination. The mean score analysis indicated that the percentage of the generated key words was the highest for information map. Behavioral objectives was the second highest and the students' own notes was the lowest. Moreover, the students' performance was the highest when the number of key words was high. For the total words it was the behavioral objectives that had more words than information maps or the students' own notes.
CHAPTER IV
EXPERIMENT #2

Introduction

The results in Experiment #1 did not show significant differences between behavioral objectives and information maps, but showed a significant difference between the two study aids that were prepared by the researcher and the students' own notes. However, no significant difference was obtained in the delayed examination. It was predicted in the first experiment that the information map study aid might have more effect in the immediate and delayed examinations. But the results did not show any significant difference in either the immediate examination or in the delayed examination.

Experiment #2 was done to validate the findings of Experiment #1 or to obtain different results. Another purpose of Experiment #1 was to examine the effectiveness of information maps, if prepared by the students, on the delayed examinations. If the students reorganize the written material to clarify the relationship between the items by putting it in a form of an information map, the key words and the regrouping of the stimuli will function as discriminative stimuli that evoke the correct
responses in the immediate and delayed examination as written in their notes. Also, students may generate their own rules when constructing the maps that help them study better.

It was conjectured that different effects (significant superiority of one study aid over another) could be obtained if the students did the information maps by themselves. In Experiment #2, the instructor's role was to design and prepare the behavioral objectives only.

Method

Subjects

Eighteen students (15 students from experiment 1 and 3 new students) participated in the second experiment. They were 13 males and 5 females. Three of the students from Experiment #1 dropped the class. The three new students were in the class but did not participate in Experiment #1.

The students were assigned to one of three groups according to their average in the first three immediate examinations. Therefore, we had three groups with approximately the same average. The second experiment was conducted in the same setting with the class of Psychology 397, that was used for Experiment #1.
Materials

Reading Materials

The purpose of the second experiment was to evaluate the students' own products which were represented by their information maps or their own notes compared to the behavioral objectives designed by the instructor. The researcher provided the students with a new set of articles to read in the class: (1) Geiselman, R. E. (1977), "Memory for prose as a function of learning strategy and inspection time"; (2) Dinnel, D. and Glover, J. A., (1985), "Advance organizer: Encoding manipulations"; and (3) Einstein, G. O., Morris, J., and Smith, S. (1985), "Note-taking, individual differences, and memory for lecture information." The articles were 7 pages on the average and were in the same area of research (learning to learn skills).

Study Aids

Behavioral Objectives

In Experiment #2, the researcher provided the behavioral objective group with behavioral objectives. The students' task was to read the objectives and answer them from the articles.
Instruction Sets

The students were given three sets of instructions (see Appendix H) prepared for behavioral objectives, information maps, and students' own notes. One set was provided to each group according to the schedule of the study aids.

Immediate Examinations

The researcher provided the students with the three immediate examination (see Appendix I) on three consecutive days. Each examination consisted of 25 multiple choice questions. The questions were designed and prepared by the researcher and revised by the instructor of the class for final approval.

Delayed Examinations

Three delayed examinations were given to the students two weeks after the first examination (see Appendix J). The delayed examinations were administered in one week on three consecutive days. These examinations were the same examinations which were given earlier with a change in the order of the questions or the options.
The same examination grading procedure used in the first experiment was followed in the second experiment to obtain the maximum accuracy in grading and recording.

Procedure

All subjects were given the same article to read for 40 minutes. Three different types of instructions were given to the students concerning the type of study aid they were to use. The first group was asked to read the article and do an information map for later use, the second group was asked to read the material and answer the behavioral objectives (prepared by the researcher). The third group was asked to do their own notes, the way they prefer, except an information map. The second and the third articles were done on the second and the third day. Each group had the opportunity to use the three study aids. After reading the material and writing their notes, the students handed the articles and the written products (notes) to the researcher. Then they were given a break for ten minutes. After the break, they were given back their products and were asked to re-read the notes for 10 minutes. Then they were given 30 minutes to do the immediate examination. Two weeks later, the students were given the three delayed examinations, one examination per day for three consecutive days.
Table 13 shows the schedule of the examinations and the distribution of the groups across the articles across the study aids.

Table 13
Experiment #2: The Distribution of the Groups Across Articles and Study Aids

<table>
<thead>
<tr>
<th>Article</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Student's Own Notes</th>
<th>Class Meets On</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Group 1</td>
<td>Group 2</td>
<td>Group 3</td>
<td>Monday Week 12</td>
</tr>
<tr>
<td>B</td>
<td>Group 2</td>
<td>Group 3</td>
<td>Group 1</td>
<td>Tuesday Week 12</td>
</tr>
<tr>
<td>C</td>
<td>Group 3</td>
<td>Group 1</td>
<td>Group 2</td>
<td>Wednesday Week 12</td>
</tr>
</tbody>
</table>

The Differences Between the Two Experiments

There were three differences between Experiment #1 and Experiment #2:

1. In Experiment #2, the students were asked to do their information maps and fill them with the correct responses in order to reread the material for the examination.

2. In Experiment #1, the articles and examinations were administered once a week for three weeks, and there was three weeks between the immediate and the delayed examinations. However, in Experiment #2, the immediate
examinations were administered in one week. The delayed examinations were given two weeks later.

3. Subjects in Experiment #2 were given 40 minutes to read the article instead of 45 minutes as in Experiment #1, and 10 minutes to reread their products instead of 15 minutes.
CHAPTER V

EXPERIMENT #2: RESULTS AND DISCUSSION

Results

There was no significant differences between the three study aids that were either prepared by the students or by the instructor. Also, the results revealed no significant differences between the three study aids in the delayed examinations.

Immediate Examinations

Study Aids Evaluation

Latin square design analysis was performed on the dependent variables of the immediate examinations' scores on Experiment #2 (see Table 14).

Table 14

Anova Table for Latin Square Design

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>F value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>15</td>
<td>474.78</td>
<td>1.39</td>
<td>0.2309</td>
</tr>
<tr>
<td>Article</td>
<td>2</td>
<td>24.33</td>
<td>0.53</td>
<td>0.5937</td>
</tr>
<tr>
<td>Study Aids</td>
<td>2</td>
<td>23.00</td>
<td>0.50</td>
<td>0.6105</td>
</tr>
<tr>
<td>Article* Study Aid</td>
<td>2</td>
<td>13.22</td>
<td>0.29</td>
<td>0.7512</td>
</tr>
</tbody>
</table>
The statistical analysis revealed a non significant study aid effect $F(0.50) = 0.6105 \ p < .05$. The article & study aid interaction was not significant $F(0.29) = 0.7512$.

**Group Performance on Examinations**

The statistical analysis revealed a non significant subject effect $F(1.39) = 0.2309 \ p < .05$. The performance of the groups is summarized in table 15 where the means of each group score on each examination was computed.

<table>
<thead>
<tr>
<th>Group</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Exam 3</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>66%</td>
<td>64%</td>
<td>68%</td>
<td>66%</td>
</tr>
<tr>
<td>2</td>
<td>72%</td>
<td>68%</td>
<td>72%</td>
<td>71%</td>
</tr>
<tr>
<td>3</td>
<td>74%</td>
<td>64%</td>
<td>64%</td>
<td>67%</td>
</tr>
<tr>
<td>Mean</td>
<td>71%</td>
<td>65%</td>
<td>68%</td>
<td>68%</td>
</tr>
</tbody>
</table>

**Groups and Study Aids**

The statistical analysis revealed a non significant study aid effect $F(0.50) = 0.6105 \ p < .05$. The perfor-
mance of the groups is summarized in table 16 where the mean of each study aid score on each examination was computed.

Table 16

Experiment #2: Immediate Examinations
Group and Study Aid Analysis

<table>
<thead>
<tr>
<th>Group #</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own notes</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>66%</td>
<td>68%</td>
<td>64%</td>
<td>66%</td>
</tr>
<tr>
<td>2</td>
<td>68%</td>
<td>72%</td>
<td>72%</td>
<td>71%</td>
</tr>
<tr>
<td>3</td>
<td>64%</td>
<td>64%</td>
<td>74%</td>
<td>67%</td>
</tr>
<tr>
<td>Mean</td>
<td>66%</td>
<td>68%</td>
<td>70%</td>
<td>68%</td>
</tr>
</tbody>
</table>

The comparison between the three study aids showed that the students' own notes study aid yielded a higher mean score (70%) than behavioral objectives (68%). Information maps yielded the lowest mean score 66%. But, there were no significant differences between the three study aids.

Delayed Examinations

Three delayed examinations were given in the second experiment, and were administered in three consecutive days, two weeks after the first immediate examination.
Study Aid Evaluation

A Latin square design analysis was performed on the dependent variables of the delayed examinations' scores (see Table 17).

Table 17
Anova Table for Latin Square Design

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>F value</th>
<th>PR &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>13</td>
<td>1101.04</td>
<td>5.93</td>
<td>0.0001</td>
</tr>
<tr>
<td>Article</td>
<td>2</td>
<td>430.18</td>
<td>13.81</td>
<td>0.0001</td>
</tr>
<tr>
<td>Study aids</td>
<td>2</td>
<td>51.72</td>
<td>1.66</td>
<td>0.2130</td>
</tr>
<tr>
<td>Article* study aid 2</td>
<td>1</td>
<td>41.07</td>
<td>1.32</td>
<td>0.2878</td>
</tr>
</tbody>
</table>

The statistical analysis revealed a non significant study aid effect $F (1.66) = 0.2130 \ P < .05$. The article + Study aid interaction was not significant $F (1.32) = 0.2878$. However, there was a significant subject effect and also a significant article effect. This may be due to the slight decrease in the number of collected observations in the delayed examination (three students were absent).
Group Performance on the Examinations

The statistical analysis revealed a significant subjects effect $F (5.93) = 0.0001 \ p < .05$. The performance of the groups is summarized in Table 18.

Table 18

<table>
<thead>
<tr>
<th>Group #</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Exam 3</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>57%</td>
<td>44%</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>2</td>
<td>58%</td>
<td>50%</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>3</td>
<td>58%</td>
<td>44%</td>
<td>50%</td>
<td>51%</td>
</tr>
<tr>
<td>Mean</td>
<td>58%</td>
<td>41%</td>
<td>51%</td>
<td>50%</td>
</tr>
</tbody>
</table>

The means of the examinations for the three groups were compared. Group 1 and 3 had the same mean (51%) for the three examinations while Group 2 had a mean of 49%. The performance of the three groups was better in the first examination (58%) than in the third examination (51%) and the second examination (41%). Group 1 obtained the best mean score in the first examination (57%), the second in the third examination (51%) and the lowest mean score in the second examination (44%). Group 2 was the best among all groups in the first examination (60%).
then the worst in the second examination (35%) and obtained the highest mean score in the last examination (53%). Group 3 obtained the second highest mean score (58%) in the first examination, 40% in the second examination, and 50% in the third examination.

Groups and Study Aids

For more clarification the group performance was compared in terms of its relation to the effect of the study aids (see Table 19).

Table 19

<table>
<thead>
<tr>
<th>Group</th>
<th>Information Map</th>
<th>Behavioral Objectives</th>
<th>Students' Own Notes</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>57%</td>
<td>51%</td>
<td>44%</td>
<td>51%</td>
</tr>
<tr>
<td>2</td>
<td>35%</td>
<td>60%</td>
<td>53%</td>
<td>49%</td>
</tr>
<tr>
<td>3</td>
<td>50%</td>
<td>44%</td>
<td>58%</td>
<td>51%</td>
</tr>
<tr>
<td>Mean</td>
<td>47%</td>
<td>52%</td>
<td>52%</td>
<td>50%</td>
</tr>
</tbody>
</table>

The difference between the three study aids was not statistically significant. Behavioral objectives and students' own notes had an equal mean score (52%). The information maps had the lowest mean score (47%).
Delayed Examination Correct Responses Comparison

The same kind of analysis was made for Experiment #2 to demonstrate the number of responses that were correct in the immediate examination and also correct in the delayed examination. The main interest in the delayed examinations was to measure the recall of the correct responses of the immediate examinations. Therefore, we computed the mean of the correct responses in each delayed examination which were also correct in the immediate examination, and divided it by the total number of correct responses in the immediate examination. The results are shown in Table 20.

The analysis as shown, indicated that the third group's recall of correct responses was the highest among all groups (63%), compared to Group 1 (57%) and Group 2 (55%). It also indicated that those who used behavioral objectives, recalled more of the correct responses (60%) that were correct in the first examination. Information maps came second (58%) and students' own notes came third (57%). Group 1 came in the second place and also the best study aid was information map (69%), behavioral
objectives (59%), and students' own notes (43%). Group 2 had the lowest mean on the three examinations (55%), and the highest recalled correct responses was obtained when the students used the behavioral objectives study aid (65%), the second highest when they used the students' own notes study aid (61%) and the lowest was when they used information map (39%).

In general, the analysis of the above table indicated that the difference among the three means was very small.

The Analysis of Students' Products

The same correlation analysis was applied here in Experiment #2 between the study aids and the number of key words and the number of the words used in the students notes.
Grades on the examinations were not correlated with the number of words or key words except on examination 1 where the correlation between the key words and the delayed examination scores was \( r = .53 \). There was no apparent correlation between study aids and key words or number of words. Students' own notes was the only study aid where total words, but not key words appeared to be correlated with examination scores and delayed scores. The more words written in the notes, the lower was the grade obtained in the examination.

**Key Words and Total Words Mean Score Analysis**

A mean score analysis was conducted in Experiment #2. The analysis describes the relation between the key words and the number of words with students' performance on the immediate and delayed examination (see Table 21).

It is clear that the three groups generated more key words under the students' own notes (70%) and had the highest mean score in the immediate (70%) and delayed (52%) examination. The three groups generated 64% of key words under behavioral objectives and got the second mean score in the immediate examination (68%) and the highest in the delayed examinations (52%). The three groups generated the least under information maps (56%), and got the lowest mean score in the immediate (66%) and delayed (47%).
Table 21

Experiment #2: Key Words and Students’ Performance on the Immediate and Delayed Examinations

<table>
<thead>
<tr>
<th>Group</th>
<th>Information map</th>
<th>Behavioral objectives</th>
<th>Students' own notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KW</td>
<td>I.EX</td>
<td>D.EX</td>
</tr>
<tr>
<td>1</td>
<td>53%</td>
<td>66%</td>
<td>57%</td>
</tr>
<tr>
<td>2</td>
<td>59%</td>
<td>68%</td>
<td>35%</td>
</tr>
<tr>
<td>3</td>
<td>55%</td>
<td>64%</td>
<td>50%</td>
</tr>
<tr>
<td>MEAN</td>
<td>56%</td>
<td>66%</td>
<td>47%</td>
</tr>
</tbody>
</table>

The analysis of the total number of words that was written in the students' notes is described in Table 22. It is obvious that all three groups wrote the least words under the information maps (227). The highest number of words was written under behavioral objectives (267) and under students' own notes (260).
Table 22

Experiment #2: Total Words and Students' Performance on the Immediate and Delayed Examinations

<table>
<thead>
<tr>
<th>Information map</th>
<th>Behavioral objectives</th>
<th>Students' own notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>#W I.EX D.EX</td>
<td>#W I.EX D.EX</td>
</tr>
<tr>
<td>1</td>
<td>242 66% 57%</td>
<td>233 68% 51%</td>
</tr>
<tr>
<td>2</td>
<td>210 68% 35%</td>
<td>314 72% 60%</td>
</tr>
<tr>
<td>3</td>
<td>230 64% 50%</td>
<td>255 64% 44%</td>
</tr>
<tr>
<td>MEAN</td>
<td>227 66% 47%</td>
<td>267 68% 52%</td>
</tr>
</tbody>
</table>

Discussion

The purpose of Experiment #2 was to examine the effects of study aids on the students' performance. It differed from Experiment #1 in that the students were asked to construct their own information map instead of one being provided by the researcher, as in Experiment #1. The question was, what would happen if the students prepared their information maps and/or did their own notes? Would they perform better in the immediate and/or the delayed examinations?

The results of Experiment #2 indicated that there were no significant differences between the three study aids that were either prepared by the students or by the
instructor. Moreover, the results revealed no significant differences between the three study aids in the delayed examinations.

Experiment #2 was conducted in the last few weeks of the semester. This means that the students had a long period of exposure to the Learning-to-Learn skills including the study aids used in the experiment. According to the class format, the students wrote a weekly essay about the Learning-to-Learn skills. The students had to revise and read the material from the assigned textbook and do the exercises for points in the class. Moreover, they used the skills in other classes and showed a proof of their accomplishment.

The time between the three immediate examinations was very short where the examinations were administered in three consecutive days. This might have affected their performance in the three examination in that they were provided with the second article the second day. The same analyses might be applied to the delayed examination.

**Immediate Examinations**

The performance of the groups was higher in the first examination (71%) but it was the lowest in the second examination (65%) and slightly higher in the third examination (68%) than the second examination. Moreover,
the effect of study aids indicated that the best effect was of the students' own notes (70%) compared to behavioral objectives (68%) and information map (66%). However, the difference was not significant.

Delayed Examinations

As mentioned earlier, there was no statistically significant difference between the three study aids. The mean score of the first delayed examination was higher (58%) than examination 2 (41%) and examination three (51%). Group 1 and Group 3 had the same mean scores in the three examinations (51%) while Group 2 which obtained the highest mean score in the immediate examination got the lowest mean (49%) in the delayed examination. The mean analysis also indicated that the behavioral objectives and the students' own notes had the same effect (52%) for both while information maps had less effect (47%), however, the difference was not significant.

The delayed examination correct responses comparison did not show a significant difference between the three study aids: behavioral objectives revealed (60%), information maps (58%), and the students' own notes (57%).

Finally, a correlation analysis was conducted to determine if the total key words or total words that students wrote in their notes on the three study aids
correlated with their performance on the examinations. The results revealed no correlation except a significant correlation between the key words and the first delayed examination. However, a mean analysis was conducted to provide more information. The mean score analysis indicated that the students' own notes generated more key words and under behavioral objectives, the percentage of generated key words was more than under information maps. The total number of words was more for behavioral objectives and then the students' own notes and the least for the information maps.
CHAPTER VI

GENERAL DISCUSSION

The present study was the first to investigate the effectiveness of the three study aids (behavioral objectives, information mapping, and students' own way of writing notes) on students' question answering. The students' performance on three immediate examinations and on three delayed examinations was evaluated. In the first experiment, the researcher provided the students with the text together with behavioral objectives for one group, an information map to fill out for another group, and instructions to do their own way of note taking for a third group. However, each group used the three study aids alternately in the three sessions.

In the second experiment, the researcher provided the students with the assigned text together with instructions and behavioral objectives for one group, instructions to make their own information map and fill it out for a second group, and instructions to make their own notes using their own way for a third group. As in the first experiment, the groups used the three study aids alternately in the three sessions. The results of the two experiments can be summarized as follows. First,
in the first experiment, effects of the study aids on immediate examinations were statistically significant. Further analysis was conducted to see which study aid was more effective. The analysis showed that information maps and behavioral objectives were significantly better than student's own notes. However, in the delayed examinations there was no superiority of any study aid. This might be because of not providing the students with feedback on the immediate examinations about the correct responses or the wrong responses.

The students' product analysis indicated that students who used information maps generated more key words and got the highest mean scores in the immediate examinations, and second highest score in the delayed examinations. However, they wrote more words than students' own notes and less words than behavioral objectives.

In the second experiment, the results showed no significant difference between the three study aids in the immediate examinations or in the delayed examinations. The students' product analysis was also conducted in the second experiment. The correlation tests indicated that there was no correlation between the study aids and the number of key words or the total number of written words. However, the mean analysis indicated that students generated more key words under
the students' own notes study aid, and got a higher mean score in the immediate examinations, than behavioral objectives or information maps. These results suggest that the information maps that were prepared by the instructor helped the students more than the maps that they generated by themselves. And as indicated before, the results in the first experiment showed an effect of the behavioral objectives and information map on the recall behavior in the immediate examinations but not in the delayed examinations.

The present research provided the system of learning-to-learn with some actual data that evaluated the study aids that can be used in the system. The data (the results of the present research) would set the occasion for further research in the area of study aids. A positive aspect of this study was observed: the students reading of research articles was improved and they became able to easily locate the answers for the objectives. Moreover, the performance of the students who used own notes aid improved when they used the information maps or behavioral objectives. It was also noticed that the group performance improved after the use of the information maps where they obtained higher examination scores.

Reviewing the literature regarding the effectiveness of behavioral objectives provided us with some answers
related to the present results and supporting the findings of the experiment 1 of the present study. Dalis (1970) investigated the effectiveness of behavioral objectives on students' achievement. The results of Dalis's experiment indicted that the group which received behavioral objectives performed significantly better than those who did not receive behavioral objectives. Huck and Long (1973) support the findings of Dalis (1970) in that behavioral objectives had a significant effect compared to no behavioral objectives. Lewis (1981) studied the effectiveness of behavioral objectives in a review paper that answered many questions regarding behavioral objectives. In one of his questions about the effectiveness of behavioral objectives on students' performance, Lewis indicated that less than 50% of the studies showed significant effects. He reviewed 84 studies, 40 of them indicated significant results while 44 showed no significant effect.

The question to ask is "do behavioral objectives improve the percentage of correct answers?" According to the present study, there was no significant effect of the use of behavioral objectives on the recall of the examination items. Lewis asked the same question and he found that among the 13 related studies that he reviewed only four indicated that behavioral objectives significantly increased retention. Olsen (1973) found
significant differences between the performance of the behavioral objective group and the control group in an immediate examination but not in delayed examinations, which supports the findings of the present study. Hartley and Davies (1976), in a review paper on the effectiveness of behavioral objectives, said:

Behavioral objectives do not appear to be useful, in terms of ultimate posttest scores, in learning tasks calling for knowledge and comprehension. On the other hand, objectives do appear to be more useful in a higher level learning tasks calling for analysis, synthesis and evaluation. (p. 249)

The results of the present study showed that information maps had a significant effect in the immediate examinations of the first experiment. Schwartz and Kulhavy (1981) stated that subjects who saw the map recalled more idea units and feature-related information on both free and cued recall tests. Holley, Dansereau, McDonald, Garland, and Collins (1979) studied the effects of networking training in the assimilation and retention of the main ideas of prose compared to a control group who used their own way of studying. The results indicated that a treatment group performed significantly better than those in students' own-notes group (control group). These results confirm the results of this study. Another study (Fourier, 1983) found significant differences between the experimental group (which used the maps) and the control group (which did not use the maps).
Regarding the effects of the students' own way of studying and taking notes, the results of the present study indicated that this study aid did not have a statistically significant (practice effect) upon the subjects' performance compared to the other study aids. Annis and Davis (1975) studied the effects of encoding (changing the form of the text) and an external memory device (study aid) on note taking. The results of the examinations showed that a combination of encoding and reviewing either their own notes or an outline of the lecture, produced the best recall scores, while both personally encoding notes and being provided with a lecture outline during lecture, produced the least recall. These findings support the present study's use of a review of the written period before the immediate examinations. Another study, by Shimmerlik and Nolan (1976), indicated that the students who took notes in the same order as the material was presented performed significantly less well than studies who reorganized the material. This also indicates that reorganizing the material in an information map helped the students perform better than using their own way of taking notes.

The mean score analysis for students' products (information maps, answers of the behavioral objectives, or students' own notes) in Experiment #1, indicated that the number of key words generated was higher when the
behavioral objective aid was used (77%) than information maps (76%) and the students' own notes (58%). This might be a result of the existence of the already listed key words in the information maps that were not counted as key words in the analysis.

Four variables might have played a major role in the first experiment that gave the two study aids (behavioral objectives and information map) the superiority over the students' own notes.

1. The objectives were provided with the text so the students would have the chance to respond appropriately to the indicated items in the objectives increase the intentional learning. The examination items covered most of the items in the objectives; and consequently, students who answered all the objectives might have performed better than the others. Hartley and Davies (1976) indicated that with the behavioral objectives, students are informed of what they are going to accomplish so that the objectives are useful once they are provided with the text. However, others, (e.g., Lewis (1981), preferred not to provide the behavioral objectives at the beginning and to provide them at the end of the unit as this might motivate the students to read the objectives.

2. Another variable to consider is that, in this study, the comparison was made between three study aids,
while most of the previous research dealt with one or two study aids at a time. However, Saint (1985) compared the effectiveness of three study aids; information map, study outline, and students own way of note taking. She found no significant effect between the three study aids.

3. The procedure in this study was different from most of the previous research in that there was a time allocated for all three groups to review their notes before the immediate examinations. This may have contributed to the increase in the effectiveness of the information maps and behavioral objectives. Gagne and Britton (1982) indicated that the data showed that the only experimental group which was given the objectives prior to a review period showed greater clustering (writing related answers) by objectives than did the no review period group. Their results supported their hypothesis that more organization (rewriting the material) of the information occurred during reviewing the objectives.

4. The students attended a training workshop that explained the appropriate study aids for reading articles and generating questions from texts and how to answer objectives. The training workshop may have helped the students in the behavioral objective and information maps groups to attain the skills needed to understand the material. But the students in students' own notes group
were not allowed to write their notes in an information map format and were not provided with behavioral objectives which might have hindered their performance.

In the second experiment, the results indicated no statistically significant difference between the three study aids either in the immediate examinations or in the delayed examinations.

As discussed in the first experiment, there are many studies that did not support the superiority of the behavioral objectives over other study aids. Chang (1976) indicated that in addition to those who found a significant effect of behavioral objectives on immediate examinations, there are many who found no significant effect e.g., Bishop, 1969; Boardman, 1970; Smith, 1967; Tiemann, 1968. However, a few found an effect of behavioral objectives on delayed examinations (e.g., Olson, 1973).

The researcher predicted that the information maps when generated by the students may have an effect on the students' performance on the delayed examinations. But the results indicated that the maps in the first experiment were equally effective as the behavioral objectives and significantly better than the students' own notes study aid. While the maps in the second experiment did not show any difference. However, no procedure was followed in the second experiment to
evaluate the difference between the behavioral objectives in the two experiments.

As mentioned before, there are many reasons for obtaining no significant difference in Experiment #2 between the three study aids in both the immediate and delayed examinations.

1. The students became familiar with the type of examination items that originally covered the behavioral objectives or the appropriate information maps so that they did not respond to the objectives and information maps as properly as they did in the first experiment.

2. As the time elapsed, students were exposed to the three study aids, then they became more familiar with the type of key words that the information map should have. Therefore, further analysis was done of the students' products, and the results indicated that the major key words or appropriate responses were available in almost the same density in the three study aids. Also it was noticed that the time spent in answering the behavioral objectives exceeded the assigned time (40 minutes). While the students who used the other study aids needed less time (mean 37 minutes) in writing their notes or forming their maps.

3. The subjects were taking a class of learning-to-learn skills and self-managements techniques. As the second experiment approached, the students' reading
skills had improved and might have affected obtaining no difference between the three study aids skills.

4. The students were tired because of the density of the assigned material for this class and the number of examinations assigned for this class and they also had to use these skills in other classes and do many exercises. Moreover, the article reading skill was improved due to the fact that they read many articles in this class.

5. Another factor is that there was no feedback given for their performance on the immediate examinations.

Future Research

For future research, it is suggested that the researchers should consider the following:

1. It would be interesting to replicate the same study with students who are not on probation.

2. A slight modification needs to be made in the training workshop. The training workshop might be extended for one week until the students become able to read the research article and answer the objectives and fill out the information maps or generate their own maps. Prior to the training on the use of the information maps and answering behavioral objectives, a training on reading a text technique needs to be extended until the students show some mastery in this aspect.
3. Change the design of the experiment in terms of giving all the subjects one study aid at a time. As indicated earlier, a longer training workshop is also needed. Repeat the experiment for several times during the semester, giving immediate and delayed examinations until the effectiveness of the study aids are thoroughly evaluated.

4. The effect of feedback on the examination, as a variable, needs to be examined. In the present study, students did not receive any feedback on their examination after being graded by the instructor. Does feedback affect the retention of the correct responses? This question needs to be answered.

5. The effects of the behavioral objectives and information maps upon group performance (team work) needs to be examined.

6. An experiment needs to be designed where the use of behavioral objectives or information maps is followed up and monitored to make sure the students' are answering the objectives and completing the maps according to the instructions given to students for that purpose.
APPENDICES
Appendix A

Information Map: Articles 1, 2, & 3
Article 1

Read the article carefully and fill out the needed information in the cells for later study for the exam.

Article's title: EFFECT OF TYPE OF OBJECTIVE LEVEL OF TEST QUESTIONS, AND THE JUDGED IMPORTANCE OF TESTED MATERIALS UPON POST TEST PERFORMANCE.

Researcher: (write the author's name)..............................
Journal: (write the journal and the year)...........................

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<tr>
<th>Question</th>
<th>Experiment 1</th>
<th>Experiment 2</th>
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<td>Subjects:</td>
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<td>How many groups are there in each experiment?</td>
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<td>What is the role of each group?</td>
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<td>What is the purpose and the prediction of each exp?</td>
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<td>Describe the material used in each exp?</td>
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<td>Describe the different levels of questions used: in the multiple choice post test.</td>
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<td>Describe the procedure in each exp. (the main points)</td>
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<td>When did the students take the post test in the second exp?</td>
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<td>Results:</td>
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<td>Discuss the performance of each group?</td>
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<td>Discuss the group's performance in the (1) application question (2) recall question in the first exp.</td>
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<td>In the second exp:</td>
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<td>State how each question level was judged (e.g., the application question was judged as important by most students.</td>
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<td>Time data:</td>
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<td>Which group spent more time studying in exp 1, in exp 2?</td>
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Article 2

Read the article carefully and fill out the needed information in the cells for later study for the exam.

**Article's title:** REORGANIZATION AND THE RECALL OF PROSE.
**Researcher:** (write the author name) ..........................
**Journal:** (write the journal and the year) .................

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<thead>
<tr>
<th>Question</th>
<th>Experiment 1</th>
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<td><strong>Abstract:</strong></td>
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<td>According to the</td>
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<td><strong>Subjects:</strong></td>
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<td>How many Subject Participated in each exp?</td>
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<td><strong>What are the questions in each exp?</strong></td>
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<td>Discuss the two differences between this study and previous research</td>
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<td><strong>Describe the independent variables</strong></td>
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<td><strong>Describe the note-taking instruction and passage organization</strong></td>
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<td><strong>Describe the materials used in each exp?</strong></td>
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<td><strong>What is the recall measure?</strong></td>
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<td>What is the subject matter of the passages?</td>
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<td>Describe the procedure in each exp. (the main points)</td>
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<td>Results:</td>
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<td>Discuss the performance of each group?</td>
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<td>(Note that you do not need to know the figures).</td>
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<td>State the findings in the delayed retention interval. See the second paragraph.</td>
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<td>When was the retention exam given?</td>
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<td>State what the results suggested?</td>
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<td>Discuss the main points in the general discussion regarding each experiment.</td>
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<td>Discuss briefly how the findings of this study are not consistent with previous research</td>
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</table>
Read the article carefully and fill out the needed information in the cells for later study for the exam.

**Article's title**: REORGANIZATION AND THE RECALL OF PROSE.

**Researcher**: (write the author name) ............................................

**Journal**: (write the journal and the year) .................................

<table>
<thead>
<tr>
<th>The Focus</th>
<th>Hypothesis</th>
<th>Predictions</th>
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<tbody>
<tr>
<td>What did the article focus on?</td>
<td>What are the hypothesis and the difference between them?</td>
<td>What are the three predictions? Include the three characteristics of this study. Note the previous research</td>
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**Questions**

**Experiment 1**

**Subjects**

- How many subjects in this study? How many group?

- What is the purpose of each exp?

**Experiment 2**

**Describe the main elements of materials used in the both exps**
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<th>Question</th>
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<td>Describe the procedure in each exp. (the main points):</td>
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<td>Discuss briefly how the findings are related to previous research</td>
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Appendix B

Behavioral Objectives: Articles 1, 2, & 3
Behavioral Objectives: Article 1

(1) For this article "Effect of type of objective level of test question, and judged importance of tested materials upon post test performance", be able to identify the author, Journal, year, and the general purpose of this study. (Don't forget to read the abstract of the article.)

(2) Note that there are two experiments in this study. Be able to identify the number of groups in each experiment, and the number of subject participated in each experiment.

(3) What is the main the purpose, and the prediction of experiment 1 as stated in the paragraph 1 in page 226.

(4) Note that in the method section, the researcher indicated that three different groups participated in this study. Identify these groups. Explain how the behavioral objective group differed from the nonbehavioral objective group and control group.

(5) Describe the materials used in experiment 1.

(6) A multiple choice post test was used in this experiment. What are the kinds of questions designed in the experiment?

(7) In the procedure section, there were three steps used. Describe these steps. Note that the first one is "they were given manila envelope bearing their names. Be able to list the other two.

(8) Note that the results are described in detail. Be able to restate the findings of the experiments.

(9) Under the time data section, the experimenter discussed the time spent for each group. Be able to discuss the relation.

(10) Summarize the prediction as it was stated in the discussion section.

(11) In experiment 2, note that there are two main points mentioned under the experiment 2 paragraph pp 228.

(12) Note that in the method section, there are three different groups. Be able to list the three groups, and the difference between these groups.
(13) Describe the material used in the second experiment. How did the post test in the second experiment differ from the post test in the first experiment. Be able to list the kinds of questions used in the multiple choice format.

(14) Describe in detail the procedure in the second experiment.

(15) Be able to indicate the 4 important points mentioned in the results section. Be able to list them.

(16) State the two important points in the discussion section.
(1) For this article "Reorganization and the recall of prose", be able to identify the author, Journal, year, and the general Hypothesis. (Don't forget to read the abstract of the article.)

(2) Note that there are two experiments in this study. Be able to identify the number of groups in each experiment and the number of subjects participated in each experiment.

(3) The present study addresses the gap between laboratory and school. The researchers attempt to answer a question. What is the question they try to answer?

(4) Note that the experiments in this article differed from previous experiments in two ways. What are these two ways?

(5) In the method section, the researcher discussed the independent variable and the design. Discuss these issues and describe the note-taking instruction and passage organization.

(6) Read the material section and be able to describe the experimental passage and the free recall measure.

(7) In the procedure section, there were different steps used. Describe these steps. Note that the first one is "the subjects were told to read.... be able to describe the rest of the procedure.

(8) Note that the results are described in detail. Be able to restate the findings of experiment 1. Note that you do not have to know the numbers but you need to talk about whether the results are significant or not.

(9) Experiment 2 was designed to answer 3 questions, be able to state all these questions.

(10) For experiment 2, be able to describe the subjects and the design.
(11) Describe in detail the procedure in the second experiment. Discuss how the second experiment differed from the first experiment.

(12) Note that the results are described in detail. Be able to restate the findings of the experiment 2. Note that you do not have to know the numbers but you need to talk about whether the results are significant or not.

(13) In the Delayed Retention Interval section, the researcher discussed many findings, especially in the second paragraph. Be able to discuss these findings.

(14) Note that under the General Discussion, the researcher stated what the results suggested. Be able to restate the suggestions.

(15) Briefly describe how the findings of this present experiments are not consistent with previous research. Note that there are some important points were mentioned. Be able to discuss them.
Behavioral Objectives: Article 3

(1) For this article "Generative effects of note-taking during science lectures", be able to identify the author, Journal, and year. What did the article focus on? What are the hypotheses? Be able to repeat what each hypothesis stated. Find the differences between each hypothesis.

(2) Identify the three predictions that were tested in this article. What was each prediction based upon?

(3) Identify the three characteristics in the current study that are not present in most existing note-taking studies. Be able to cite some previous research that provided some support to the first prediction of generative theory.

(4) Note that this study was designed to replicate some previous research. Discuss this issue.

(5) Note that there are two experiments in this study. Be able to identify the number of groups in each experiment and the number of subjects in each experiment. What is the purpose of the first experiment?

(6) Read the material section and be able to describe the material and design in detail.

(7) In the procedure section, there were different steps used. Describe these steps. Note that the first one is "the subjects were tested in small..." be able to describe the rest of the procedure.

(8) Note that the results are described in details. Be able to restate the findings of experiment 1. Note that you do not have to know the numbers.

(9) What was the purpose of the second experiment? You need to know this section in detail as it is important to know why they did this experiment.

(10) In Experiment #2, be able to describe the subjects and the design. Be able to know the number of groups participated in the second experiment and describe the function of each group.
(11) Describe in detail the material, apparatus, and the procedure in the second experiment.

(12) Note that the results are described in detail. Be able to restate the findings of the Experiment #2. Note that you do not have to know the numbers.

(13) Discuss the no-text control group results and also discuss the analysis of content of notes. Note that there is another sample of 24 observations taken from the notes of unfamiliar subjects in Experiment #2. Be able to discuss the results of these sample.

(14) Note that under the conclusion section, the researchers discussed different important issues. Be able to discuss these issues and also the results suggested.
Appendix C

Students' Own Notes: Articles 1, 2, & 3
Read the article assigned carefully and write your own notes below for later study for the test:
Appendix D

Instructions For Reading and Study Aids: Sets 1 & 2
(1) You will be given (45) Minutes to read the written material which is provided to you by the instructor.

(2) Write your name on both the written materials and the study aid.

(3) Read the material carefully and use the study aid in order to master these materials.

(4) The study aid (Information map, behavioral objective, and your own notes) must be completed clearly and correctly for later use to help you study for the exam.

(5) By the end of the assigned period, you must complete the study aid.

(6) The instructor will inform you of the time.

(7) Turn in the completed study aid with the written material to your instructor in order to see your proof of accomplishment.

(8) Take a 10 minute break.
Instruction Set 2

(1) Each person must be seated in his assigned seat.

(2) The study aid that you have completed will be given back to you in order to study and help you prepare for the exam.

(3) You will be given (15) minutes to study.

(4) The instructor will tell you when to begin and when to stop reading.

(5) At the end of the study period, you must hand in your study aid to the instructor.

(6) The instructor will give you the exam sheet together with the answer sheet. Please, write your name on both.

(7) You have (30) minutes in order to complete the exam.

(8) By the end of the given period, the instructor will ask you to stop writing and to hand in your exam with the answer sheet.
Appendix E

Experiment #1: Exams 1, 2, & 3

and

Answer Keys
Exam 1

1. The author of the article is:
   A. R. Carlson
   B. M. Heiman
   C. Orpha Duell
   D. None of the above.

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Journal of Educational Psychology
   C. Journal of Experimental Education
   D. Psychological Record

3. According to the abstract of the article, what was the purpose of the research:
   A. To discover what controls student's behavior while studying?
   B. To discover the relationship between motivation and written material?
   C. To discover the importance of posttest upon student's performance?
   D. To discover under what conditions providing behavioral objectives during studying improves the amount learned?

4. The first experiment was designed to:
   A. Investigate the joint effects of the level of the test questions and the availability of behavioral objectives on learning from written material.
   B. Investigate the effect of information mapping upon student's performance.
   C. Investigate the effect of time management upon task completion.
   D. All of the above.
   E. None of the above.
5. The researcher predicted that the difference between behavioral objective group and the non-behavioral objective group:

A. Would not be significant.
B. Would be significant.
C. Was not clear.
D. Was not significant for application questions.

6. How many groups did the author use for experiment 1?

A. Two experimental and one control group.
B. Three experimental and one control group.
C. Three experimental and two control groups.
D. Three experimental and no control groups.

7. How many passages did the experimenter use in both experiments?

A. 4 passages
B. 5 passages
C. 3 passages
D. 2 passages

8. A multiple choice posttest was used that included which kinds of questions?

A. Only recognition questions.
B. Only application questions.
C. Both recognition and application questions.
D. Analysis and Synthesis questions.

9. According to the researcher's definition of a recognition question, it is where the students need to recognize something:

A. That they had read in the passage.
B. That they had not read in the passage.
C. That they had read in the passage but can't be recognized.
D. none of the above.
10. According to the author, an application question is one in which the students:

A. Choose the situation which was an example of the process named in the question.
B. Choose the situation which was an example of the process named in a different article.
C. Choose the situation from their own experience that is an example of the process.
D. None of the above.

11. In the first experiment, group two (non behavioral objective group) was given no objectives, but they were given:

A. Information mapping.
B. 30 item multiple choice questions to determine if they know and understand the material.
C. Nothing but asked to study hard.
D. None of the above.

12. In the procedure the two experimental groups were given two envelopes: one containing the material and the other containing the test. The control group was given:

A. nothing
B. Materials, but no test
C. Material and the test
D. The test and told to do their best.

13. Which of the following is the result of this experiment?

A. Both experimental groups performed significantly different than the control group.
B. There was no significant difference.
C. Control group did better than the experimental group.
D. None of the above.

14. The results show that in application questions there were:

A. Significant differences between the behavioral objective group and non behavioral objective group.
B. Non significant differences between the two groups.
C. No clear results.
D. None of the above.
15. On the recall question, which of the following performed better?

A. The control group.
B. The non behavioral objective group.
C. The behavioral objective group.
D. No group performed significantly better.

16. According to the time data, the group who spent more time in studying was:

A. Control group.
B. Behavioral objective group.
C. Non behavioral objective group.
D. None of the above.

17. The main purpose of experiment 2 was to test the following hypothesis: "The judged importance of an item of information determines whether knowledge of the behavioral objective..."

A. During training is helpful.
B. Before training is helpful.
C. Is helpful, no matter when the training is given.
D. None of the above.

18. According to the experimental design of the second experiment, how many groups participated in the experiment.

A. Three experimental group and one control group.
B. One control group but no experiment group.
C. Two experimental group and one control group.
D. Three experimental group but no control group.

19. The experimenter used 5 passages as material for the second experiment. How many passages were from the first experiment.

A. 3 passages
B. 2 passages
C. 4 passages
D. 1 passages

20. The post test was given to the students after

A. 5 days
B. 8 days
C. 1 day
D. 11 days
21. According to the results of the second experiment, the application question items were judged important by:
   A. The control group.
   B. The behavioral objective and nonbehavioral objective group
   C. All groups.
   D. None of the above

22. The recognition questions that required dates and names were classified as:
   A. Easy questions.
   B. Unimportant.
   C. Nonsignificant.
   D. none of the above.

23. According to the results of the second experiment, the data of this study do not support the hypothesis that the judged importance of an item of information determines whether knowledge of behavioral objective during training is helpful.
   A. True
   B. False

24. Students receiving behavioral objectives during studying performed significantly better on test questions that the majority of the students classified as unimportant than did students given a nonbehavioral objectives.
   A. True
   B. False

25. There was no difference in the important question between behavioral objective group and nonbehavioral objective group
   A. True
   B. False
Study 1
Immediate Exam 1
Answer Key

(1)  C
(2)  B
(3)  D
(4)  A
(5)  A
(6)  A
(7)  B
(8)  C
(9)  A
(10) A
(11) B
(12) D
(13) A
(14) B
(15) C
(16) B
(17) A
(18) C
(19) C
(20) D
(21) C
(22) B
(23) A
(24) A
(25) A
Exam 2

1. The author of the article is:
   A. D. Brethower and R. Malott
   B. R. Kaplan and Morgan
   C. M. Tessmer and M. Driscoll
   D. S. Shimmerlik and J. Nolan

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Journal of Educational Psychology
   C. Journal of Experimental Education
   D. Psychological Record

3. The title of the present article is:
   A. Thinking about learning
   B. The free recall and a category clustering of factual material presented in complex sentence
   C. Passage organization and learning strategies
   D. Reorganization and the recall of prose.

4. According to the abstract of the article, which of the following was the hypothesis:
   A. Study aid may control student's behavior while studying?
   B. There is a relationship between note-taking and reading material. and written material?
   C. That organizing written material while taking notes would aid free recall.
   D. All of the above.

5. The first experiment attempts to answer the following question:
   A. Does reorganizing written material, while taking notes, aid recall for that material.
   B. Does following the instruction may help recall for exams?.
   C. Does motivation affect recalling the written material?
   D. Do all students need to reorganize the material in order to recall the prose?
6. This study differ from previous experiments in two ways. The first one they used school learning material and the second one is:

A. Subject were asked to reorganize the information during study.
B. Subjects were asked just to remember the important things.
C. Subjects were asked to reorganize their answers during the exam.
D. Just a slight difference in the structure of the experiment.

7. The two independent variables are:

A. Note-taking and passage sequence.
B. Note-taking and passage organization.
C. Note-taking and time studying.
D. Note-taking and number of passages.

8. The students were instructed to organize the passages

A. Either by society or by topic
B. By topic only
C. By society only
D. None of the above.

9. Note-taking instructions were:

A. Either sequential or by certain topics
B. Only sequential.
C. Only by topic.
D. None of the above.

10. The experimental passage consisted of two versions of a 1220 word passage containing information from the field of:

A. Psychology
B. Anthropology
C. Economy
D. Religion

11. The two versions of the passages were:

A. Identical in contents
B. Identical in organization
C. Identical in contents differed only in organization
D. Identical in organization differed only in contents
12. In the procedure, subjects were told to read before they would be tested. They were given a certain time to read the passages which was:

A. 12 minutes
B. 30 minutes
C. 9 minutes
D. Nothing but given a time to organize the material

13. However, they were given 27 minutes to take notes and 24 minutes to?

A. Write what they remember
B. Study
C. memorize
D. Reorganize the passage according to topics.

14. The Two way Analysis of Variance indicated that the effect of note-taking instruction was:

A. Significant
B. Not significant
C. Significant only with the control group
D. None of the above.

15. Subjects who reorganized written material while taking notes obtained significantly higher unit scores than those who:

A. Took their notes in the same sequential order as it was organized in the passages.
B. Were in the control group.
C. Were in the behavioral objective group.
D. A and C

16. The results of Experiment 1 seem consistent with the

A. Memorization Hypothesis
B. Behavioral Hypothesis.
C. Encoding variability hypothesis.
D. Recalling hypothesis.
17. Experiment 2 was designed to answer three questions. Which one of the following is not correct?

A. Does the effect of free recall of reorganizing written material while taking notes persist when subjects are given the name of the categories?
B. Is the effect of type of note-taking instruction on free recall different for subjects at different levels of verbal students?
C. Do the effects persist?
D. Would reorganizing the material be generalized to other classes.

18. A free recall was measured at retention interval of

A. 4 minutes and 7 days.
B. 10 minutes and 3 days.
C. 2 minutes and 4 days.
D. 5 minutes and 15 days.

19. The only other difference in procedure between experiment 1 and experiment 2 was the categories of the minor organization of the passage were written in the blackboard for:

A. All the students.
B. Just for those in the note-taking group.
C. For reorganization group.
D. For those in the control group.

20. The Results of the 3 way analysis of variance in experiment 2 for the effect of note-taking instruction, and verbal aptitude on unit scores and weighted scores yielded

A. Similar results
B. Not significant results
C. Significant but similar
D. Not significant and not similar.

21. Inspection of the means for weighted scores indicates that benefits of reorganizing written material while taking notes was greatest for subject at:

A. The control group.
B. The average level of verbal aptitude.
C. All groups.
D. None of the above.
22. In the delayed retention interval, for unit scores, the effect of note-taking instruction closely approached,
A. But it was significant
B. Unimportant.
C. But did not reach, statistical significance.
D. None of the above.

23. The results of both experiments 1 and 2 suggest that reorganizing written social studies material while taking notes, results in a higher level of free recall at any immediate retention interval of 4 minutes, than does organizing notes in the same sequence in the passage.
A. True
B. false

24. The results of the present experiments demonstrate the feasibility of applying principles of organization theory of memory to real learning situations.
A. True
B. False

25. The findings for the present experiment are consistent with those of Perlmutter and Royer (1973) who failed to find support for the hypothesis that reorganization of simple prose material leads to increased level for free recall.
A. True
B. False
Experiment 1
Answer Key

Exam 2

(1) D
(2) B
(3) D
(4) A
(5) A
(6) A
(7) B
(8) C
(9) A
(10) A
(11) B
(12) D
(13) A
(14) B
(15) C
(16) B
(17) A
(18) C
(19) C
(20) D
(21) C
(22) B
(23) A
(24) A
(25) A
Exam 3

1. The author of the article is:
   A. B. Bretzing and R. Kulhavy
   B. R. Kaplan and Morgan
   C. R. Peper and R. Mayer
   D. S. Shimmerlik and J. Nolan

2. This article was published in the:
   A. Journal of Applied Behavior Analysis.
   B. Journal of Research In Educational Psychology.
   C. Journal of Experimental Psychology.
   D. Journal of Educational Psychology.

3. This article was published in the year of:
   A. 1978
   B. 1988
   C. 1987
   D. 1986

4. The title of the present article is:
   A. Generating effect of behavioral objectives during science lectures.
   B. Generative effect of note-taking during science lectures.
   C. Generative effects of note-taking during sociology lectures.
   D. None of the above
5. The article investigates three hypotheses concerning how note-taking affects the learner's cognitive processing during encoding: 

A. Attention, production, and generative hypotheses 
B. Attention, distraction, and generative hypotheses. 
C. Attention, organization, and generative hypotheses. 
D. Attention, evaluation, and generative hypotheses. 

6. The attention hypothesis is: 

A. Note-taking forces the learner to pay more attention to the presented material more deeply. 
B. Note-taking forces the learner to pay more attention to similar notes. 
C. Note-taking forces the learner to pay more attention to the examples written in the article. 
D. None of the above. 

7. The distraction hypotheses states that note-taking forces the learner: 

A. To concentrate on listening more fully than the motor act of writing. 
B. To concentrate more on reviewing the notes without any distraction. 
C. To concentrate more on remembering most of the lecture without any distraction. 
D. To concentrate on the motor act of writing instead of fully listening to the lecture. 

8. According to distraction hypothesis, note-takers in the present study would, on the average, perform: 

A. Better than non note-takers on all relevant dependent measures when lecture information was presented rapidly. 
B. Worse than non note-takers. 
C. Better than those in the control group. 
D. the same as any group but with more trivial mistakes.
9. The generative hypotheses is based on the idea that additional cognitive processes are involved. For example, the degree to which the learner is able:

A. To actively relate the material to existing knowledge.
B. To actively relate the material to new knowledge.
C. To actively relate the material to new similar articles.
D. None of the above.

10. The first prediction, a pattern of treatment X post test interaction (TPI) in which note-takers performed better than non note-takers on:

A. Near-transfer tests but worse on far-tests was expected.
B. Far-transfer tests but worse on near-tests was expected.
C. Every test.
D. Only on none related tests.

11. There are three characteristics in the current study that are not all present in most existing note-taking studies. Which of the following is not one of them:

A. Concurrent note-taking for a moderately paced lecture with no opportunity for review.
B. Learners who are familiar with the material.
C. Learners who are unfamiliar with the material.
D. Dependent measures that include both near and far transfer.

12. The present study was designed to replicate and extend Peper and Mayer's (1978) results by examining whether:

A. This pattern of TPI could be obtained using new material.
B. The TPI is strong mainly for unfamiliar rather than familiar learners.
C. The TPI can also be obtained for other generative activities.
D. All of the above are correct.
E. A and B but not C.
13. The purpose of experiment 1 was to examine the:

A. First and the second prediction  
B. The second prediction  
C. The first prediction of generative theory.  
D. The three predictions

14. In experiment 1, 40 high school students served as subjects: 20 subjects served in the notes group, and 20 served in the no-notes group. However,

A. all the subjects had no prior experience with working on car engine. 
B. the notes group had no prior experience with working on car engine. 
C. The no-notes group had no prior experience with working on car engine. 
D. The control group had no prior experience with working on car engine.

15. The materials included:

A. A subject questionnaire, and a videotaped lecture.  
B. A subject questionnaire, a videotaped lecture, and four postests. 
C. A subject questionnaire, a videotaped lecture, and five post tests. 
D. A subject questionnaire, a videotaped lecture, and only one immediate test and one post test.

16. The videotaped lecture consisted of:

A. A 23-min, 2500 word lecture on the note taking procedure. 
B. A 23-min, 2500 word lecture on the working of car engines. 
C. A 35-min, 2500 word lecture on the working of car engines. 
D. Two 35-min, 2500 word lecture on the working of car engines.
17. In the procedure, and following the lecture, the researcher:

A. instructed all the students to watch the videotape
B. collected all notes and four postests were administered.
C. One of the tests was given.
D. None of the above.

18. The results of the first experiment were most consistent with:

A. The distraction hypotheses.
B. The attention hypotheses.
C. The generative hypotheses.
D. B and C

19. The purpose of the second experiment was to replicate and extend the results of experiment 1 by examining:

A. Three predictions of the generative hypotheses
B. Three predictions of the three hypotheses.
C. Two predictions from the attention and one from the generative hypotheses.
D. None of the above.

20. Experiment 2 included different groups as:

A. Summary note-taking and question-answering treatment group, as well as the note-taking group.
B. Only note-taking and no note-taking groups.
C. Summary note-taking and question-answering treatment group.
D. Summary note-taking and question-answering treatment group, as well as the note-taking and no note-taking group.

21. The results of the second experiment were most consistent with the predictions of:

A. The distraction hypotheses.
B. The attention hypotheses.
C. The generative hypotheses.
D. B and C
22. The results showed that the no-text-control group performance on the problem solving transfer test were:

A. Significantly better than the notes group and summary notes group.
B. Significantly worse than the notes group and summary notes group.
C. Significantly better than the notes group only.
D. Significantly better summary notes group.

23. The results of the analysis of contents of notes were consistent with:

A. The attention hypotheses
B. The recall hypotheses
C. The distraction hypotheses
D. The idea that note content is related to subject's performance on fact retention questions.

24. The results of both experiments 1 and 2 suggest that studies of generative activities such as note taking should not focus on the question "Does treatment x increase the overall amount learned?"

A. True
B. False

25. The current results of the present experiments coupled with previous results by Peper and Mayer (1978), support the view that under appropriate conditions, note taking can encourage the learner to actively build external connections between what is presented and what he or she already knows.

A. True
B. False
Experiment #1
Immediate Exam 3
Answer Key

(1)  C
(2)  D
(3)  D
(4)  B
(5)  B
(6)  A
(7)  D
(8)  B
(9)  A
(10) B
(11) B
(12) D
(13) C
(14) A
(15) B
(16) B
(17) B
(18) C
(19) A
(20) D
(21) C
(22) B
(23) D
(24) A
(25) A
Appendix F

Experiment #1: Delayed Exams 1, 2, & 3
and
Answer Keys
Delayed Exam 1

1. The author of the article is:
   A. Robert Duval
   B. Orpha Duell
   C. Donald Jackson
   D. None of the above.

2. This article was published in the:
   A. Psychological Record
   B. Journal of Applied Behavior Analysis
   C. Journal of Experimental Education
   D. Journal of Educational Psychology

3. According to the abstract of the article, what was the purpose of the research:
   A. To discover how much control an instructor can assert over student's learning behavior.
   B. To discover the relationship between objectives and written material?
   C. To discover the importance of posttest upon student's retention of learned material.
   D. To discover under what conditions providing behavioral objectives during studying improves the amount learned?

4. The first experiment was designed to:
   A. Investigate the joint effects of information mapping and the availability of behavioral objectives upon student's performance.
   B. Investigate the joint effects of the level of the test questions and the availability of behavioral objectives on learning from written material.
   C. Investigate the effect of time management upon task completion, given specific behavioral objectives.
   D. All of the above.
   E. None of the above.
5. The researcher predicted that the difference between behavioral objective group and the non-behavioral objective group:
   A. Would be significant.
   B. Would not be significant.
   C. Was not significant for application questions.
   D. Was not clear.

6. How many groups did the author use for experiment 1?
   A. Two experimental and one control group.
   B. One experimental and one control group.
   C. One experimental and two control groups.
   D. Three experimental and one control group.
   E. None of the above.

7. According to researcher's definition of a recognition question, it is where the students need to recognize something:
   A. That they had not read in the passage.
   B. That they had read in the passage but can't be recognized.
   C. That they had read in the passage.
   D. None of the above.

8. According to the author, an application question is one in which the students:
   A. Choose the situation from their own experience that is an example of the process.
   B. Choose the situation which was an example of the process named in the question.
   C. Choose the situation which was an example of the process named in a different article.
   D. None of the above.

9. In the first experiment, group two (non behavioral objective group) was given no objectives, but they were given:
   A. Nothing but asked to study hard.
   B. Information mapping.
   C. 30 item multiple choice questions to determine if they knew and understood the material.
   D. None of the above.
10. In the procedure, the two experimental groups were given two envelopes, one containing the material and the other containing the test. The control group was given:
   A. Nothing
   B. Materials, but no test
   C. Material and the test
   D. The test and told to do their best.

11. Which of the following is the result of this experiment?
   A. Control group did better than the experimental group.
   B. Both experimental groups performed significantly different than the control group.
   C. There was no significant difference.
   D. None of the above.

12. The results show that in application questions, the differences between the behavioral objective group and the non behavioral objective group were:
   A. Significant
   B. Non significant
   C. Not clear
   D. None of the above.

13. On the recall question, which of the following performed better?
   A. The behavioral objective group.
   B. The non behavioral objective group.
   C. The control group.
   D. No group performed significantly better.

14. According to the time data, the group who spent more time in studying was:
   A. Behavioral objective group.
   B. Non behavioral objective group.
   C. Control group.
   D. There was no time data recorded.
15. The main purpose of experiment 2 was to test the following hypothesis: "The judged importance of an item of information determines whether knowledge of the behavioral objective..."

A. Before training is helpful.
B. During training is helpful.
C. Is helpful, no matter when the training is given.
D. None of the above.

16. According to the experimental design of the second experiment, how many groups participated in the experiment.

A. Three experimental group but no control group.
B. One control group and one experiment group.
C. Three experimental group and one control group.
D. Two experimental group and one control group.
E. None of the above.

17. The experimenter used 5 passages as material for the second experiment. How many passages were from the first experiment.

A. 1 passages
B. 2 passages
C. 5 passages
D. 3 passages
E. None of the above.

18. The post test was given to student after

A. 5 days
B. 7 days
C. 14 days
D. 11 days
E. None of the above.

19. The recognition question that required dates and names were classified as:

A. Statistically nonsignificant.
B. Unimportant.
C. Easy questions.
D. None of the above.

20. According to the result of the second experiment the data of this study do not support the hypothesis that the judged importance of an item of information determines whether knowledge of behavioral objective during training is helpful.

A. True
B. false
Experiment #1

Answer Key

Delayed Exam 1

(1) B
(2) D
(3) D
(4) B
(5) B
(6) A
(7) C
(8) B
(9) C
(10) D
(11) B
(12) B
(13) A
(14) A
(15) B
(16) D
(17) E
(18) D
(19) B
(20) B
Delayed Exam 2

1. The Author of this article "Reorganization and the recall of prose" is:
   A. R. Kaplan and Morgan
   B. S. Shimmerlik and J. Nolan
   C. M. Tessmer and M. Driscoll
   D. D. Brethower and R. Malott

2. This article was published in the:
   A. Journal of Educational Psychology
   B. Journal of Applied Behavior Analysis
   C. Journal of Experimental Education
   D. Psychological Record

3. The first experiment attempts to answer the following question.
   A. Does reorganizing written material, while taking notes, aid recall for that material.
   B. Does following the instruction help recalling for exams.
   C. Does motivation affect recalling the written material.
   D. Do all students need to reorganize the material in order to recall the prose.

4. According to the abstract of the article, which of the following was the hypothesis:
   A. Study aid may control student's behavior while studying?
   B. There is a relationship between note-taking and reading material. And written material?
   C. Organizing written material while taking notes would aid free recall.
   D. All of the above.
5. In the procedure, subjects were told to read, then they would be tested. They were given a certain time to read the passages which was:

A. 12 minutes  
B. 30 minutes  
C. 9 minutes  
D. No time to study, but given a time to organize the material

6. This study differs from the previous experiments in two ways: 1) The first one is that they used school learning material, and the second one is:

A. Subjects were asked to reorganize the information during study.  
B. Subjects were asked just to remember the important things.  
C. Subjects were asked to reorganize their answers during the exam.  
D. Just a slight difference in the structure of the experiment.

7. The students were instructed to organize the passages

A. Either by society or by topic.  
B. By topic only.  
C. By society only.  
D. None of the above.

8. Note-taking instructions were:

A. Either sequential or by certain topics  
B. Only sequential.  
C. Only by topic.  
D. None of the above.

9. The two independent variables are:

A. Note-taking and passage sequence.  
B. Note-taking and passage organization.  
C. Note-taking and time studying.  
D. Note-taking and number of passages.

10. The experimental passage consisted of two versions of a 1220 word passage containing information from the field of:

A. Psychology  
B. Anthropology  
C. Economy  
D. Religion.
11. The two versions of passages were:
   A. Identical in contents
   B. Identical in organization
   C. Identical in contents differed only in organization
   D. Identical in organization differed only in contents

12. The two-way analysis of variance indicated that the effect of note-taking instruction was:
   A. Significant
   B. Not significant
   C. Significant only with the control group
   D. None of the above.

13. Subjects who reorganized written material while taking notes obtained significantly higher unit scores than those who:
   A. Took their notes in the same sequential order as it was organized in the passages.
   B. Who were in the control group.
   C. Took the behavioral objectives.
   D. A and C

14. Experiment 2 was designed to answer three questions. Which one of the following is not correct.
   A. Does the effect of free recall of reorganizing written material while taking notes persist when subjects are given the name of the categories?
   B. Is the effect of the type of note-taking instruction on free recall different for subjects at different levels of verbal students?
   C. Do the effects persist.
   D. Would reorganizing the material be generalized to other classes.

15. A free recall was measured at retention interval of
   A. 4 minutes and 7 days.
   B. 10 minutes and 3 days.
   C. 2 minutes and 4 days.
   D. 5 minutes and 15 days.
16. The only other difference in procedure between experiment 1 and experiment 2 was the categories of the minor organization of the passage were written on the blackboard for:

A. All the students 2 passages.
B. Just for those in the note-taking group.
C. For reorganization group.
D. For those in the control group.

17. Inspection of the means for weighted scores indicates that benefits of reorganizing written material while taking notes was greatest for subject at:

A. The control group.
B. The average level of verbal aptitude.
C. All groups.
D. None of the above

18. In the delayed retention interval, for unit scores, the effect of note-taking instruction closely approached but, 

A. It was significant
B. It was unimportant.
C. It did not reach, statistical significance.
D. none of the above.

19. The results of both experiments 1 and 2 suggest that reorganizing written social studies material while taking notes resulted in a higher level of free recall at any immediate retention interval of 4 minutes, than did organizing notes in the same sequence in the passage.

A. True
B. false

20. The results of the present experiments demonstrate the feasibility of applying principles of organization theory of memory to real learning situations.

A. True
B. False
Experiment #1

Answer Key

Delayed Exam 2

(1) B
(2) A
(3) A
(4) C
(5) C
(6) A
(7) A
(8) A
(9) B
(10) B
(11) C
(12) A
(13) A
(14) D
(15) A
(16) A
(17) B
(18) C
(19) A
(20) A
1. The author of this article "Generative effect of note-taking during science lectures" is:
   A. B. Bretzing and R. Kulhavy
   B. R. Kaplan and Morgan
   C. R. Peper and R. Mayer
   D. S. Shimmerlik and J. Nolan

2. This article investigates three hypotheses concerning how note-taking affects the learner's cognitive processing during encoding the:
   A. Attention, production, and generative hypotheses
   B. Attention, distraction, and generative hypotheses.
   C. Attention, organization, and generative hypotheses.
   D. Attention, evaluation, and generative hypotheses

3. This article was published in the:
   A. Journal of Applied Behavior Analysis.
   B. Journal of Research In Educational Psychology.
   C. Journal of Experimental Psychology.
   D. Journal of Educational Psychology.

4. This article was published in the year of:
   A. 1978
   B. 1988
   C. 1987
   D. 1986

5. The attention hypothesis is that:
   A. Note-taking forces the learner to pay more attention to the presented material more deeply.
   B. Note-taking forces the learner to pay more attention to similar notes.
   C. Note-taking forces the learner to pay more attention to the examples written in the article.
   D. None of the above.
6. The distraction hypotheses states that note-taking forces the learner:
   
   A. To concentrate on listening more fully than the motor act of writing.
   B. To concentrate more on reviewing the notes without any distraction.
   C. To concentrate more on remembering most of the lecture without any distraction.
   D. To concentrate on the motor act of writing instead of fully listening to the lecture.

7. The generative hypotheses is based on the idea that additional cognitive processes are involved. For example, the degree to which the learner is able:
   
   A. To actively relate the material to existing knowledge.
   B. To actively relate the material to new knowledge.
   C. To actively relate the material to new similar articles.
   D. None of the above.

8. The first prediction, a pattern of treatment X post test interaction (TPI) in which note-takers performed better than non note-takers on:
   
   A. Near-transfer tests but worse on far-tests was expected.
   B. Far-transfer tests but worse on near-tests was expected.
   C. Every test.
   D. Only on none related tests.

9. There are three characteristics in the current study that are not all present in most existing note-taking studies. Which of the following is not one of them:
   
   A. Concurrent note-taking for a moderately paced lecture with no opportunity for review.
   B. Learners who are familiar with the material.
   C. Learners who are unfamiliar with the material.
   D. Dependent measures that include both near and far transfer.
10. The present study was designed to replicate and extend Peper and Mayer's (1978) results by examining whether:

A. This pattern of TPI could be obtained using new material.
B. The TPI is strong mainly for unfamiliar rather than familiar learners.
C. The TPI can also be obtained for other generative activities.
D. all of the above are correct.
E. A and B but not C

11. The purpose of experiment 1 was to examine the:

A. First and the second prediction.
B. The second prediction.
C. The first prediction of generative theory.
D. The three predictions.

12. The materials included:

A. A subject questionnaire, and a videotaped lecture.
B. A subject questionnaire, a videotaped lecture, and four post tests.
C. A subject questionnaire, a videotaped lecture, and five post tests.
D. A subject questionnaire, a videotaped lecture, and only one immediate test and one post test.

13. The videotaped lecture consisted of:

A. A 23-min, 2500 word lecture on the note taking procedure.
B. A 23-min, 2500 word lecture on the working of car engines.
C. A 35-min, 2500 word lecture on the working of car engines.
D. Two 35-min, 2500 word lecture on the working of car engines.

14. In the procedure, and following the lecture, the researcher:

A. instructed all the students to watch the videotape.
B. collected all notes and four post tests were administered.
C. one of the tests was given.
D. None of the above.
15. The results of the first experiment were most consistent with:

A. The distraction hypotheses.
B. The attention hypotheses.
C. The generative hypotheses.
D. B and C

16. Experiment 2 included different groups as:

A. Summary note-taking and question-answering treatment group, as well as the note-taking group.
B. Only note-taking and no note-taking groups.
C. Summary note-taking and question-answering treatment group.
D. Summary note-taking and question-answering treatment group, as well as the note-taking and no note-taking group.

17. The results of the second experiment were most consistent with the predictions of:

A. The distraction hypotheses.
B. The attention hypotheses.
C. The generative hypotheses.
D. B and C

18. The results showed that the no-text-control group performance on the problem solving transfer test were:

A. Significantly better than the notes group and summary notes group.
B. Significantly worse than the notes group and summary notes group.
C. Significantly better than the notes group only.
D. Significantly better summary notes group.

19. The results of both experiments 1 and 2 suggest that studies of generative activities such as note taking should not focus on the question "Does treatment x increase the overall amount learned?"

A. True
B. False

20. The current results of the present experiments coupled with previous results by Peper and Mayer (1978), support the view that under appropriate conditions, note taking can encourage the learner to actively build external connections between what is presented and what he or she already knows.

A. True
B. False
Experiment #1
Answer Key
Delayed Exam 3

(1) C
(2) B
(3) D
(4) D
(5) A
(6) D
(7) A
(8) B
(9) B
(10) D
(11) C
(12) B
(13) B
(14) B
(15) C
(16) D
(17) C
(18) B
(19) A
(20) A
Appendix G
Instructions for the Delayed Examinations
Instructions for the Delayed Exams

(1) Please sit down in your previously assigned seats.
(2) You will be given a test today on the material that you read three weeks ago.
(3) Read the questions carefully before you start answering the exam.
(4) You will be given time to answer the exam.
(5) You can start when the instructor tells you to do so.
(6) This test will examine your recalling behavior and the effectiveness of the study aids that you used while studying.
Appendix H

Instruction sets for Experiment #2
Information Maps, Behavioral Objectives,
Students' Own Notes
Instructions

Information maps

(1) - You will be handed an article, and you have to generate your own information map.

- Please, try to fill out your own information map.

- The assigned time for reading and forming your information map is 40 minutes.

(2) - Write down the time you spent in reading and forming your information map.

- Hand the article to the instructor and keep the information map on your desk for later use.

- Take a break, for ten minutes, after the assigned 40 minutes then come back to class.

(3) - You will be given 10 minutes to read the information map that you formed earlier.

(4) Please write your name and social security number on the article, information maps, and the exam.

(5) Before you take the exam, hand in the information map.

(6) - You will be given a multiple choice exam for 30 minutes. Write down the amount of time you took to finish the exam.
Own Notes Group Instruction

(1) - You will be handed an article, and you have to generate your own notes but not information maps.

- The assigned time for reading and forming your own notes is 40 minutes.

(2) - Write down the time you spent in reading and generating your own notes.

- Hand the article to the instructor and keep the Notes on your desk for later use.

- Take a break, for ten minutes, after the assigned 40 minutes then come back to class.

(3) - You will be given 10 minutes to read your own notes that you generated earlier.

(4) Please write your name and social security number on the article, own notes, and the exam.

(5) Before you take the exam, please, hand in the notes.

(6) - You will be given a multiple choice exam for 30 minutes.

- Write down the amount of time you took to finish the exam.
Behavioral Objective Group

(1) - You will be handed an article and behavioral objectives.
   - Please, try to answer all of the objectives.
   - The assigned time for reading and answering the objectives is 40 minutes.

(2) - Write down the time you spent in reading and answering the objectives.
   - Hand the article to the instructor and keep the objectives on your desk for later use.
   - Take a break, for ten minutes, after the assigned 40 minutes then come back to class.

(3) You will be given 10 minutes to read the objectives that you answered earlier.

(4) Please write your name and social security number on the article, Behavioral objectives, and the exam.

(5) Before you take the exam please hand in the objectives and the answer notes.

(6) You will be given a multiple choice exam for 30 minutes. Write down the amount of time you took to finish the exam.
Appendix I

Experiment #2: Exams 1, 2, & 3

and

Answer Keys
**Experiment 2: Exam 1**

1. The author of the article is:
   - A. R. Carlson
   - B. M. Heiman
   - C. R. E. Geiselman
   - D. None of the above.

2. This article was published in the:
   - A. Journal of Applied Behavior Analysis
   - B. Journal of Educational Psychology
   - C. Journal of Experimental Education
   - D. Psychological Record

3. According to the abstract of the article, what was concluded from the two experiments is that both the type of processing and the duration of processing influenced:
   - A. retention in goal directed learning tasks.
   - B. motivation in the goal directed learning tasks.
   - C. both motivation and retention in goal directed learning tasks.
   - D. nothing but increase effort required for studying.

4. The first experiment was designed to compare the effects of providing learning goals with the effects of semantic positive forgetting instruction under unpaced study condition on:
   - A. the retention of information from a prose passage.
   - B. the inspection time for each sentence.
   - C. the inspection time for some sentences.
   - D. A and B
   - E. A and C

5. This article was published in:
   - A. 1974
   - B. 1977
   - C. 1978
   - D. 1979
6. The subjects who participated in this experiments were undergraduate students from the University of California at Los Angeles and the number of students was:

A. 20 undergraduate students  
B. 40 undergraduate students  
C. 60 undergraduate students  
D. 80 undergraduate students.

7. The group who was instructed to remember information relevant to all four of the subtopics was:

A. Remember all four  
B. Control group  
C. Remember all four or control group  
D. None of the above.

8. Among these groups are the following

A. Remember four, especially two  
B. Remember two, forget two  
C. Remember four, forget nothing  
D. A and B but not C  
E. A and C but not B

9. The remember two forget two corresponds to the:

A. Control group  
B. Semantic positive-forgetting condition  
C. Goal directed learning condition  
D. None of the above.

10. The group who was viewed as the goal-directed learning condition is:

A. Remember four, especially two  
B. Remember two, forget two  
C. Remember four, forget nothing  
D. A and B but not C  
E. A and C but not B

11. The stimulus materials were 25 sentences taken from a passage about

A. Tanning leather  
B. Leather's origins  
C. Kinds of leathers  
D. None of the above
12. There are two subtopics in the first set, consisted of 7 sentences and were labeled:
   A. Instruction set
   B. Remember two, forget two
   C. Goal-directed set
   D. Subtopic set

13. The subjects were tested four at a time using facilities made available at:
   A. The classroom
   B. The computer center
   C. The experimental lap
   D. The instructor office

14. The goal directed group was told "You will be asked to write down as much as you can remember about these four subtopic. But you should make more emphasis on learning a bout:
   A. The leather cleaning process
   B. The four subtopics.
   C. The designated two topics.
   D. A and C

15. The semantic positive group was told that they will not be tested on:
   A. The two specified to be forgotten subtopic
   B. The two specified to be remembered subtopic
   C. The four specified subtopic
   D. None of the above

16. Each subject's overt behavior was monitored during the experiment via:
   A. A closed circuit TV system
   B. An independent observer
   C. The instructor
   D. Another participant

17. According to the experiment, which option represents the dependent variables:
   A. Sentence and subtopics recall
   B. Sentence recall and time inspection
   C. Time inspection and recall instruction
   D. A and C
18. According to the results of experiment 1, the goal directed and semantic positive groups showed:

A. An increase in learning of the sentences from subtopics that were emphasized as compared to control group.
B. A decrease in learning of the sentences from subtopics that were emphasized as compared to control group.
C. No significant effect
D. None of the above.

19. Experiment 1 showed that providing specific instruction (goal directed or directed forgetting) about how to process a passage induced readers to study most of the material at a slower pace.

A. True
B. False

20. Also the results of the first experiment indicated that when subjects were told to place special emphasis on some of the material, they spent less time on the material that was not emphasized as well as on the material that was emphasized.

A. True
B. False

21. The second experiment was conducted to investigate

A. Whether instructions are important for learning
B. Whether an increase in the time spent on the subtopics was necessary for the increase in learning.
C. Whether remembering some of the material and forgetting the other is important.
D. None of the above.

22. The method in the second experiment is the same as in the first experiment, but subjects were:

A. Not allowed to control the amount of the time that they viewed each sentence
B. Given a limited time to remember the material
C. Allowed to control the amount of the time that they viewed each sentence.
D. None of the above.
23. According to the results of the second experiment, the data showed that the overall probability of recall was higher in experiment 2 with paced study conditions than in experiment 1 with unpaced study conditions.

A. True
B. false

24. The results of experiment 2 suggested that the increase in inspection time for the sentences referring to the subtopics that were emphasized in the goal directed learning group was not necessary for increased integration and learning of these sentences to occur.

A. True
B. False

25. In general, the results of the present experiments are consistent with the position of Arkes et al (1976) that "two factors are involved in the successful retention of prose material: the quality of interaction with the material, and the duration of that interaction."

A. True
B. False
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1. The author of the article is:
   A. R. C. Anderson and R. J. Spiro
   B. R. Kaplan and Morgan
   C. D. Dinnel and J. Glover
   D. S. Shimmerlik and J. Nolan

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Journal of Educational Research
   C. Journal of Experimental Education
   D. None of the above is correct.

3. The title of the present article is:
   A. Advance Organizers: Encoding Manipulation.
   B. The Use of Advance Organizers in the Learning and Retention form Prose.
   C. Do Advance Organizers facilitate Learning.
   D. Effects of An organizer on Memory from Prose.

4. The two experiments were conducted to examine the possibility that varying student's methods of encoding advance organizers would
   A. Influence the memorability of the organizers and subsequent reading materials.
   B. Reduce the time needed for mastering the material.
   C. Increase the time needed for finishing reading the material.
   D. All of the above.

5. The first experiment contrasted three encoding procedures in the reading of 1300 word essay. Which of the following is not correct:
   A. A non-organizer, read only control.
   B. A condition that required subjects merely to read the organizers.
   C. A condition that required subjects merely to read the organizer and do some summaries about the essay.
   D. A condition that required subjects merely to read the organizers and list the "key words" they contained.
6. In addition to the three encoding procedures in the first experiment, both "true" organizers and "control" organizers were:

A. Used to allow a contrast of advance organizers with other, non organizers prefatory materials.
B. Asked just to remember the important things.
C. Allowed to compare time spent in reading with and without the organizers.
D. None of the above.

7. Experiment 2 replicated experiment 1 but entailed only three conditions. Which of the following is not one of the three conditions:

A. Control
B. Read organizer and chapter only.
C. Paraphrase organizer and read chapter
D. Read organizer only.

8. Experiment 2 replicated experiment 1 but used

A. A complete textbook chapter as the material to be learned.
B. A complete textbook chapter as the material to be learned in addition to the essay that was used before.
C. A complete set of organizers.
D. Half a chapter from psychology textbook.

9. The authors said that "our predictions were highly similar to those for experiment 1, except that:

A. We did not expect to find no significant differences among conditions in study time.
B. We did not expect to find significant differences among conditions in remembering.
C. We did not expect to find no significant differences among conditions in remembering.
D. We did not expect to find significant differences among conditions in study time.

10. According to the article, how many subjects participated in experiment 1

A. 86 students
B. 66 students
C. 76 students
D. 45 students
11. In the first experiment, materials were consisted of a 1300 word essay, and

A. One type of organizers
B. Two types of organizers
C. Three types of organizers
D. Four types of organizers.

12. In the procedure, subjects were assigned to five different conditions. Three of them are control group, true organizers only, true organizers + paraphrasing. The other two are:

A. Control organizer only, control organizer + summarizing.
B. Experimental organizer only, control organizer + paraphrasing.
C. Control organizer only, control organizer + paraphrasing.
D. Control organizer only, experimental organizer + paraphrasing.

13. Subjects' protocol were scored by two raters on the following dependent measures:

A. Time spent reading the essay and time spent answering the post test,
B. Time spent in reading the essay, and number of recalled sentences.
C. The number of ideas they recalled that had appeared in the organizers and the number of ideas they recalled that had appeared in the essay itself
D. Time and number of recalled ideas.

14. The results in experiment 1 indicated that on the essay recall variable, subjects in the true organizer + paraphrasing condition recalled significantly more essay content than did subjects in

A. Control organizer only
B. True organizer only
C. Control organizer + paraphrasing
D. Control group
15. A separate analysis was performed on the study time data in the first experiment and found that

A. The control conditions required significantly less study time than did any other condition.
B. The control conditions required significantly more study time than did any other condition.
C. The true organizer only required significantly more study time than did any other condition.
D. The true organizer only required significantly less study time than did any other condition.

16. The results of experiment 1 found that the recall of the organizers was:

A. Significantly greater in the two paraphrase conditions than any other condition.
B. Significantly greater in the two paraphrase conditions than only the true organizer group.
C. Significantly greater in the two paraphrase conditions than only the control only group.
D. Significantly greater in the two paraphrase conditions than the control organizer only.

17. The elapsed time (study time), in experiment 1 results generally agreed with the prediction. The overall pattern of study time use was

A. Control organizer only.
B. True organizer + paraphrase
C. True organizer + paraphrase group and control organizer + paraphrase.
D. Control group

18. According to the method section, how many subjects participated in experiment 2

A. 55 undergraduate students
B. 45 undergraduate students
C. They are the same subjects who participated in the first experiment
D. 65 undergraduate students
19. Subjects' protocol (experiment 2) was scored by two raters on the following dependent measures

A. Time spent in reading the essay, and number of recalled sentences.
B. Time spent reading the essay and time spent answering the post test.
C. Time and number of recalled ideas.
D. The number of ideas they recalled that had appeared in the organizers and the number of ideas they recalled that had appeared in the chapter itself.

20. The Results of experiment 2 indicated that most of the chapter was significantly recalled by

A. True organizer only
B. True organizer + paraphrasing
C. Control organizer + paraphrasing
D. Control group

21. No significant difference on chapter recall was observed between

A. True organizer only and the control conditions
B. True organizer + paraphrasing and control conditions
C. Control organizer + paraphrasing and true organizer only
D. Control organizer only and control organizer + paraphrasing.

22. The results of the two experiments were as follows: paraphrasing, which requires readers to deal with the semantic base of organizers, did not increase the memorability of organizers.

A. True
B. False

23. The results of both experiments indicated that only true organizers had a facilitative effect on the memorability of subsequent reading material.

A. True
B. False
24. The educational implication of this study are clear. Advance organizers work will only if they are carefully encoded by students.

A. True  
B. False

25. The two experiments, of course, are not directly comparable because different materials and subject pools were used.

A. True  
B. False
(1) C
(2) D
(3) A
(4) A
(5) C
(6) A
(7) D
(8) A
(9) A
(10) C
(11) B
(12) C
(13) C
(14) A OR D
(15) A
(16) B
(17) B
(18) B
(19) D
(20) B
(21) A
(22) B
(23) A
(24) A
(25) A
1. The author of the article is:
   A. R. Carlson
   B. M. Heiman and B. Watson
   C. G. Einstein, J. Morris, and Susan Smith
   D. None of the above.

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Journal of Educational Psychology
   C. Journal of Experimental Education
   D. Psychological Record

3. According to the abstract of the article, the two experiments were performed to examine
   A. The encoding function of note-taking
   B. Processing differences between successful and less successful students in lecture situations.
   C. The importance of note-taking upon student's performance?
   D. A and B but not C
   E. B and C but not A

4. One purpose of the present studies was to test directly the quantitative and qualitative views by examining
   A. The ability of the students to remember the material after a period of time.
   B. The effect of note-taking on the recall of propositions varying in their importance to the lecture.
   C. The effect of training on note-taking upon recalling.
   D. None of the above
5. According to the quantitative hypothesis, note-taking should enhance

A. Memory for all types of propositions, regardless of their importance to the theme of the lecture
B. Memory for some types of propositions, regardless of their importance to the theme of the lecture
C. Memory for all types of propositions, but with more emphasis on of their importance to the theme of the lecture.
D. Memory for Some types of propositions, but with more emphasis on their importance to the theme of the lecture.

6. Another goal of the present experiments was to examine

A. The contents of subject's notes and the relation between this contents and the time spent taking notes.
B. The contents of subject's notes and the relation between note-taking and retention exams.
C. A and B but not C
D. The content of subject's notes and the relation between this content and recall.

7. In experiment 1, subjects either took notes or listened during

A. The presentation of lecture by the instructor and later were asked to recall the lecture
B. The presentation of a videotaped lecture and later were asked to recall the lecture
C. Reading the material given to them by the instructor and later were asked to recall the lecture
D. During reading the material, and after the presentation of the videotaped lecture.

8. A major feature of the present study was that

A. The proposition in the lecture were rated for their importance to the lecture.
B. The proposition in the lecture were rated for their importance to the instructor.
C. The proposition in the lecture were rated for their importance to the subjects.
D. The proposition in the lecture were rated for their importance to note-taking skills.
9. According to the article, how many subjects participated in experiment 1

A. 44 students  
B. 26 students  
C. 24 students  
D. 45 students

10. In the first experiment, the lecture contained many statements about

A. The lives of particular people  
B. Their involvement in important events  
C. The causes and consequences of these events  
D. The effects of these development on the history of individual differences  
E. All of the above are correct

11. In the procedure, subjects were randomly assigned to two different groups.

A. Control group and experimental group  
B. Two experimental groups, but the two groups differed in terms of whether they were asked to listen or take notes during the presentation of the lecture.  
C. Control group, and two experimental groups (one listens and the other one takes notes).  
D. No control groups but three experimental groups (two listen to the lecture and one only was allowed to take notes).

12. All subjects in the first experiment participated in a single session lasting approximately

A. 50 minutes  
B. 40 minutes  
C. 45 minutes  
D. 30 minutes

13. Following the lecture, in the first experiment, all subjects were

A. Given an exam  
B. Given 10 minutes break  
C. Instructed to rate their comprehension of the lecture, and they were given 10 minutes to write down everything that they could remember from the lecture.  
D. A and B
14. In the results section of experiment 1, the analysis of comprehension rating revealed that all groups thought that the lecture was

A. Easy to comprehend
B. Difficult to comprehend

15. Although the note-taking group recalled more proposition than did the others, this difference was

A. Reliable
B. Not reliable
C. Not clear
D. Clear and reliable

16. A separate analysis was performed on the overall recall and the data indicated that there was

A. A significant difference between the listening only and note-taking groups.
B. No significant difference between the listening group only and note-taking .
C. A significant difference within the listening group only
D. A significant difference within note-taking groups.

17. The results of experiment 1 found that note-taking

A. Does not improve the recall of all propositions
B. Really improves the recall of all propositions
C. It improves the recall only of the high importance proposition
D. A and B
E. A and C

18. According to the method section, the design of experiment 2 was

A. 2 X 2 X 2
B. 2 X 3 X 3
C. 3 X 3 X 3
D. none of the above.
19. The independent variables in experiment 2 were

A. Successful students vs less successful students
B. Immediate testing vs 1 week delay
C. Review vs no review
D. All of the above

20. In the successful students, which of the following was used as the indicator of academic success

A. Grade Point Average (GPA)
B. The students grade in GEMAT
C. The students grade in psychology class
D. The students grade in (SAT)

21. The results of experiment 2 indicated that reviewing the notes

A. Improved recall at delayed testing only.
B. Did not improve recall at delayed testing.
C. Improve recall at immediate test.
D. None of the above.

22. After one week retention interval, in the second experiment, subjects who reviewed the notes

A. Recalled notes nearly the same like subjects who did not review their notes.
B. Recalled notes nearly two times more propositions than did subjects who did not review their notes.
C. Did not recall as much as it was expected.
D. Recalled notes nearly four times more propositions than did subjects who did not review their notes.

23. In the second experiment, the notes and recall of successful and less successful students were compared. The results indicated that the successful students recalled more of the most important propositions but they did not differ in their recalling of less important propositions.

A. True
B. False
24. The analyses of the notes and the comparison of the notes with recall indicated that the recall differences between successful and less successful students were not due to factors occurring at encoding (rather than at retrieval).

A. True
B. False

25. The author said that "another result of interest in the present research was the interaction between the delay of testing and review variables. Whereas many researchers have shown that reviewing one's notes increases recall, our results suggest that the benefits of reviewing had no appreciable effects on recall."

A. True
B. False
### Experiment #2

**Immediate Exam 3**

**Answer Key**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Appendix J

Experiment #2: Delayed Exams 1, 2, & 3

and

Answer Keys
1. The group who was instructed to remember information relevant to all four of the subtopics was:
   A. Remember all four
   B. Control group
   C. Remember all four or control group
   D. None of the above.

2. This article was published in the:
   A. Journal of Educational Psychology
   B. Journal of Applied Behavior Analysis
   C. Journal of Experimental Education
   D. Psychological Record

3. The first experiment was designed to compare the effects of providing learning goals with the effects of semantic positive forgetting instruction under unpaced study condition on:
   A. The inspection time for some sentences.
   B. The retention of information from a prose passage.
   C. The inspection time for each sentence.
   D. A and B
   E. A and C

4. This article was published in:
   A. 1974
   B. 1978
   C. 1977
   D. 1979

5. The subjects who participated in this experiments were undergraduate students from the University of California at Los Angeles and the number of students was:
   A. 60 undergraduate students
   B. 20 undergraduate students
   C. 40 undergraduate students
   D. 80 undergraduate students.
6. The author of the article "Memory for Prose as a Function of Learning Strategy and Inspection Time" is:

A. R. E. Geiselman
B. R. Carlson
C. M. Heiman
D. None of the above.

7. The remember two forget two corresponds to the:

A. Goal directed learning condition
B. Control group
C. Semantic positive-forgetting condition
D. None of the above.

8. The group who was viewed as the goal-directed learning condition is:

A. Remember two, forget two
B. Remember four, forget nothing
C. Remember four, especially two
D. A and B but not C
E. A and C but not B

9. According to the abstract of the article, what was concluded from the two experiments is that both the type of processing and the duration of processing influenced:

A. Motivation in the goal directed learning tasks.
B. Both motivation and retention in goal directed learning tasks.
C. Nothing but increase effort required for studying.
D. Retention in goal directed learning tasks.

10. The stimulus materials were 25 sentences taken from a passage about

A. Tanning leather
B. Leather's origins
C. Kinds of leathers
D. None of the above
11. The results of experiment 2 suggested that the increase in inspection time for the sentences referring to the subtopics that were emphasized in the goal directed learning group was not necessary for increased integration and learning of these sentences to occur.

A. True
B. False

12. There are two subtopics in the first set, consisted of 7 sentences and were labeled:

A. Instruction set
B. Remember two, forget two
C. Goal-directed set
D. Subtopic set

13. Among these groups are the following

A. Remember four, especially two
B. Remember two, forget two
C. Remember four, forget nothing
D. A and C but not B
E. A and B but not C

14. The goal directed group was told "You will be asked to write down as much as you can remember about these four subtopic. But you should make more emphasis on learning about:

A. The leather cleaning process
B. The four subtopics.
C. The designated two topics.
D. A and C

15. The semantic positive group was told that they will not be tested on:

A. The two specified to be remembered subtopic
B. The four specified subtopic
C. The two specified to be forgotten subtopic
D. None of the above

16. According to the experiment, which option represents the dependent variables:

A. Sentence and subtopics recall
B. Sentence recall and time inspection
C. Time inspection and recall instruction
D. A and C
17. According to the results of experiment 1, the goal directed and semantic positive groups showed:

A. A decrease in learning of the sentences from subtopics that were emphasized as compared to control group.
B. An increase in learning of the sentences from subtopics that were emphasized as compared to control group.
C. No significant effect
D. None of the above.

18. Experiment 1 showed that providing specific instruction (goal directed or directed forgetting) about how to process a passage induced readers to study most of the material at a slower pace.

A. True
B. False

19. Also the results of the first experiment indicated that when subjects were told to place special emphasis on some of the material, they spent less time on the material that was not emphasized as well as on the material that was emphasized.

A. True
B. False

20. The second experiment was conducted to investigate

A. Whether instructions are important for learning
B. Whether remembering some of the material and forgetting the other is important.
C. Whether an increase in the time spent on the subtopics was necessary for the increase in learning.
D. None of the above.

21. Each subject's overt behavior was monitored during the experiment via:

A. An independent observer
B. The instructor
C. Another participant.
D. A closed circuit TV system
22. The method in the second experiment is the same as in the first experiment, but subjects were:

A. Not allowed to control the amount of the time that they viewed each sentence
B. Given a limited time to remember the material
C. Allowed to control the amount of the time that they viewed each sentence.
D. None of the above.

23. According to the results of the second experiment, the data showed that the overall probability of recall was higher in experiment 2 with paced study conditions than in experiment 1 with unpaced study conditions.

A. True
B. False

24. The subjects were tested four at a time using facilities made available at:

A. The classroom
B. The experimental lab
C. The instructor office
D. The computer center

25. In general, the results of the present experiments are consistent with the position of Arkes et al (1976) that "two factors are involved in the successful retention of prose material: the quality of interaction with the material, and the duration of that interaction.

A. True
B. False
Experiment #2
Delayed Exam 1
Answer Key

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Experiment 2: Delayed Exam 2

1. The author of the article "Advance Organizers: Encoding Manipulations" is:
   A. D. Dinnel and J. Glover
   B. R. C. Anderson and R. J. Spiro
   C. R. Kaplan and Morgan
   D. S. Shimmerlik and J. Nolan

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Journal of Educational Research
   C. Journal of Experimental Education
   D. None of the above is correct.

3. The two experiments were conducted to examine the possibility that varying student's methods of encoding advance organizers would
   A. Reduce the time needed for mastering the material.
   B. Influence the memorability of the organizers and subsequent reading materials.
   C. Increase the time needed for finishing reading the material.
   D. All of the above.

4. The first experiment contrasted three encoding procedures in the reading of 1300 word essay. Which of the following is not correct?
   A. A condition that required subjects merely to read the organizers.
   B. A condition that required subjects merely to read the organizer and do some summaries about the essay.
   C. A non-organizer, read only control.
   D. A condition that required subjects merely to read the organizers and list the "key words" they contained.
5. In addition to the three encoding procedures in the first experiment, both "true" organizers and "control" organizers were:
   A. Allowed to compare time spent in reading with and without the organizers.
   B. Used to allow a contrast of advance organizers with other, non organizers prefatory materials.
   C. Asked just to remember the important things.
   D. None of the above.

6. Experiment 2 replicated experiment 1 but entailed only three conditions. Which of the following is not one of the three conditions:
   A. Read organizer and chapter only.
   B. Paraphrase organizer and read chapter
   C. Control
   D. Read organizer only.

7. Experiment 2 replicated experiment 1 but used
   A. A complete textbook chapter as the material to be learned in addition to the essay that was used before.
   B. A complete textbook chapter as the material to be learned.
   C. A complete set of organizers.
   D. Half a chapter from psychology textbook.

8. The authors said that "our predictions were highly similar to those for experiment 1, except that:
   A. We did not expect to find no significant differences among conditions in study time.
   B. We did not expect to find significant differences among conditions in study time.
   C. We did not expect to find significant differences among conditions in remembering.
   D. We did not expect to find no significant differences among conditions in remembering.

9. According to the article, how many subjects participated in experiment 1
   A. 66 students
   B. 86 students
   C. 76 students
   D. 45 students
10. In the first experiment, materials were consisted of a 1300 word essay, and

A. One type of organizers
B. Two types of organizers
C. Three types of organizers
D. Four types of organizers.

11. In the procedure, subjects were assigned to five different conditions. Three of them are control group, true organizers only, true organizers + paraphrasing. The other two are:

A. Control organizer only, control organizer + paraphrasing.
B. Control organizer only, control organizer + summarizing.
C. Experimental organizer only, control organizer + paraphrasing.
D. Control organizer only, experimental organizer + paraphrasing.

12. Subjects' protocol were scored by two raters on the following dependent measures:

A. Time spent in reading the essay, and number of recalled sentences.
B. Time spent reading the essay and time spent answering the post test.
C. The number of ideas they recalled that had appeared in the organizers and the number of ideas they recalled that had appeared in the essay itself.
D. Time and number of recalled ideas.

13. The results in experiment 1 indicated that on the essay recall variable, subjects in the true organizer + paraphrasing condition recalled significantly more essay content than did subjects in

A. Control organizer only
B. Control organizer + paraphrasing
C. Control group
D. True organizer only
14. A separate analysis was performed on the study time data in the first experiment and found that

A. The control conditions required significantly less study time than did any other condition.
B. The true organizer only required significantly more study time than did any other condition.
C. The control conditions required significantly more study time than did any other condition.
D. The true organizer only required significantly less study time than did any other condition.

15. The results of experiment 1 found that the recall of the organizers was:

A. Significantly greater in the two paraphrase conditions than any other condition.
B. Significantly greater in the two paraphrase conditions than only the true organizer group.
C. Significantly greater in the two paraphrase conditions than only the control only group.
D. Significantly greater in the two paraphrase conditions than the control organizer only.

16. The elapsed time (study time), in experiment 1 results generally agreed with the prediction. The overall pattern of study time use was

A. Control group
B. Control organizer only.
C. True organizer + paraphrase
D. True organizer + paraphrase group and control organizer + paraphrase.

17. According to the method section, how many subjects participated in experiment 2

A. 55 undergraduate students
B. 45 undergraduate students
C. They are the same subjects who participated in the first experiment
D. 65 undergraduate students
18. Subjects' protocol (experiment 2) was scored by two raters on the following dependent measures:

A. Time spent in reading the essay, and number of recalled sentences.
B. Time and number of recalled ideas.
C. The number of ideas they recalled that had appeared in the organizers and the number of ideas they recalled that had appeared in the chapter itself.
D. Time spent reading the essay and time spent answering the post test.

19. The Results of experiment 2 indicated that most of the chapter was significantly recalled by:

A. True organizer only
B. True organizer + paraphrasing
C. Control organizer + paraphrasing
D. Control group

20. No significant difference on chapter recall was observed between:

A. True organizer only and the control conditions
B. True organizer + paraphrasing and control conditions
C. Control organizer + paraphrasing and true organizer only
D. Control organizer only and control organizer + paraphrasing.

21. The results of the two experiments were as follows: paraphrasing, which requires readers to deal with the semantic base of organizers, did not increase the memorability of organizers.

A. True
B. False

22. The results of both experiments indicated that only true organizers had a facilitative effect on the memorability of subsequent reading material.

A. True
B. False
23. The educational implication of this study are clear. Advance organizers work will only if they are carefully encoded by students.

A. True
B. False

24. The two experiments, of course, are not directly comparable because different materials and subject pools were used.

A. True
B. False

25. This article was published in the year of:

A. 1980
B. 1985
C. 1968
D. 1975
Experiment θ2
Delayed Exam 2
Answer Key

(1) A
(2) D
(3) B
(4) B
(5) B
(6) D
(7) B
(8) A
(9) C
(10) B
(11) A
(12) C
(13) A OR C
(14) A
(15) B
(16) C
(17) A
(18) C
(19) B
(20) A
(21) B
(22) A
(23) A
(24) A
(25) B
1. The author of the article "Note-Taking, Individual difference, and Memory for Lecture Information" is:
   A. M. Heiman and B. Watson
   B. R. Carlson
   C. G. Einstein, J. Morris, and Susan Smith
   D. None of the above.

2. This article was published in the:
   A. Journal of Applied Behavior Analysis
   B. Psychological Record
   C. Journal of Educational Psychology
   D. Journal of Experimental Education

3. According to the abstract of the article, The two experiments were performed to examine
   A. The encoding function of note-taking
   B. The importance of note-taking upon student's performance?
   C. Processing differences between successful and less successful students in lecture situations.
   D. A and B but not C
   E. B and C but not A

4. One purpose of the present studies was to test directly the quantitative and qualitative views by examining
   A. The effect of note-taking on the recall of propositions varying in their importance to the lecture.
   B. The ability of the students to remember the material after a period of time.
   C. The effect of training on note-taking upon recalling.
   D. None of the above
5. According to the quantitative hypothesis, note-taking should enhance

A. Memory for some types of propositions, regardless of their importance to the theme of the lecture
B. Memory for all types of propositions, but with more emphasis on their importance to the theme of the lecture.
C. Memory for all types of propositions, regardless of their importance to the theme of the lecture
D. Memory for some types of propositions, but with more emphasis on their importance to the theme of the lecture.

6. Another goal of the present experiments was to examine.

A. The contents of subject's notes and the relation between this contents and the time spent taking notes.
B. The contents of subject's notes and the relation between note-taking and retention exams.
C. A and B but not C
D. The content of subject's notes and the relation between this content and recall.

7. In experiment 1, subjects either took notes or listened during

A. The presentation of lecture by the instructor and later were asked to recall the lecture
B. The presentation of a videotaped lecture and later were asked to recall the lecture
C. During reading the material, and after the presentation of the videotaped lecture.
D. Reading the material given to them by the instructor and later were asked to recall the lecture.

8. A major feature of the present study was that

A. The proposition in the lecture were rated for their importance to the instructor.
B. The proposition in the lecture were rated for their importance to the lecture.
C. The proposition in the lecture were rated for their importance to the subjects.
D. The proposition in the lecture were rated for their importance to note-taking skills.
9. According to the article, how many subjects participated in experiment 1

A. 44 students
B. 26 students
C. 24 students
D. 45 students

10. In the first experiment, the lecture contained many statement about

A. The lives of particular people
B. The causes and consequences of these events
C. The effects of these development on the history of individual differences
D. Their involvement in important events
E. All of the above are correct

11. In the procedure, subjects were randomly assigned to two different group.

A. Control group, and two experimental groups (one listen and the other one take notes.
B. Control group and experimental group
C. Two experimental groups, but the two groups differed in terms of whether they were asked to listen or take notes during the presentation of the lecture.
D. No control groups but three experimental groups (two listen to the lecture and one only was allowed to take notes.

12. All subjects in the first experiment participated in a single session lasting approximately

A. 40 minutes
B. 45 minutes
C. 50 minutes
D. 30 minutes

13. Following the lecture, in the first experiment, all the subjects were

A. Given 10 minutes break
B. Given an exam
C. Instructed to rate their comprehension of the lecture, and they were given 10 minutes to write down everything that they could remember from the lecture.
D. A and B
14. In the results of experiment 1, the analysis of comprehension rating revealed that all groups thought that the lecture was

A. Easy to comprehend
B. Difficult to comprehend

15. Although the note-taking group recalled more proposition than did the others, this difference was

A. Reliable
B. Not reliable
D. Clear and reliable
C. Not clear

16. A separate analysis was performed on the overall recall and the data indicated that there was

A. No significant difference between the listening group only and note-taking.
B. A significant difference between the listening only and note-taking groups.
C. A significant difference within the listening group only.
D. A significant difference within note-taking groups.

17. The results of experiment 1 found that note-taking

A. Really improves the recall of all propositions
B. Does not improve the recall of all propositions
C. It improves the recall only of the high importance proposition
D. A and B
E. A and C

18. According to the method section, the design of experiment 2 was

A. 2 X 2 X 2
B. 2 X 3 X 3
C. 3 X 3 X 3
D. None of the above.

19. The independent variables in experiment 2 were

A. Review vs no review
B. Successful students vs less successful students
C. Immediate testing vs 1 week delay
D. All of the above
20. In the successful students, which of the following was used as the indicator of academic success

A. Grade Point Average (GPA)  
B. The students grade in GEMAT  
C. the students grade in psychology class  
D. the students grade in (SAT)

21. The Results of experiment 2 indicated that reviewing the notes.
A. Did not improve recall at delayed testing.  
B. Improved recall at delayed testing only.  
C. Improve recall at immediate test.  
D. None of the above.

22. After one week retention interval, in the second experiment, subjects who reviewed the notes
A. Did not recall as much as it was expected.  
B. Recall notes nearly the same like subjects who did not review their notes.  
C. Recall notes nearly two times more propositions than did subjects who did not review their notes.  
D. Recall notes nearly four times more propositions than did subjects who did not review their notes.

23. In the second experiment, the notes and recall of successful and less successful students were compared. The results indicated that the successful students recalled more of the most important propositions but they did not differ in their recalling of less important propositions.
A. True  
B. False

24. The analyses of the notes and the comparison of the notes with recall indicated that the recall differences between successful and less successful students were not due to factors occurring at encoding (rather than at retrieval).
A. True  
B. False

25. The author said that "another result of interest in the present research was the interaction between the delay of testing and review variables. Whereas many researchers have shown that reviewing one's notes increases recall, our results suggest that the benefits of reviewing had no appreciable effects on recall."
A. True  
B. False
Experiment 2
Delayed Exam 3
Answer Key

(1) C
(2) C
(3) D
(4) A
(5) C
(6) D
(7) B
(8) B
(9) C
(10) E
(11) C
(12) B
(13) C
(14) A
(15) B
(16) E
(17) E
(18) A
(19) D
(20) D
(21) B
(22) D
(23) A
(24) B
(25) A
Appendix K

WMU Research Protocol

and

Informed Consent Sheet
TO: Yousef Abu-Hmaiden  
FROM: Ellen Page-Robin, Chair  
RE: Research Protocol  
DATE: February 24, 1989

This letter will serve as confirmation that your research protocol, "The Effects of Study Aids for Written Materials on Recalling," is now complete and has been signed off by the HSIRB.

If you have any further questions, please contact me at 387-2647.
FROM: YOUSEF ABUHMAIDAN
TO: PSCYH 397 STUDENTS
SUBJECT: INFORMED CONSENT SHEET

I am doing my dissertation on the evaluation of three different study aids: Behavioral objectives, information mapping, and students' own way of studying. This research will provide additional information about the best method of the three previously mentioned. The outcome of this study is to provide the students with the best study aid to help him/her improve the studying habits.

I would like your permission to use the scores obtained from the examinations on the particular articles assigned for this study in psych 397.

I assure absolute confidentiality and privacy of the data obtained from this study. Your name will be used only for the purpose of identification and is not to be mentioned in the final write-up.

If you don not wish to have your data used, please let us know by writing a note to us saying "I do not want my data to be used" and sign the note so we can remove your data from the analysis.
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Young, J. M. (1975). The effects of knowledge of perceived learning style on the educational development of selected community college students. (Doctoral dissertation, East Texas State University, 1974). *Dissertation Abstracts International, 35*, 4268A. (University Microfilm No. 75-1606)